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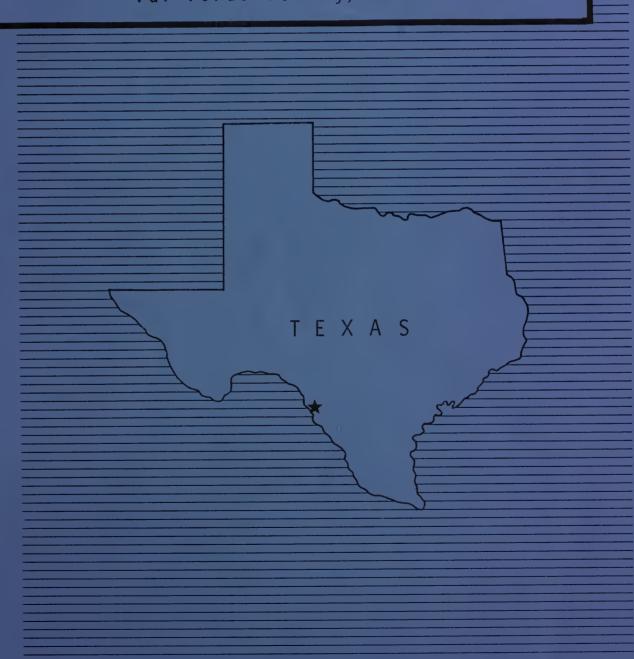
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FINAL ENVIRONMENTAL IMPACT STATEMENT USDA-SCS-ES-WS-(ADM)-74-12-(F)

SAN FELIPE CREEK WATERSHED PROJECT

Val Verde County, Texas



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SAN FELIPE CREEK WATERSHED Val Verde County, Texas

FINAL ENVIRONMENTAL IMPACT STATEMENT

Edward E. Thomas, State Conservationist MATHUNAL LIBRARY Soil Conservation Service

JUL 3 0 1976

CATALOGING - PREP.

Sponsoring Local Organizations:

Devils River Soil and Water Conservation District P.O. Box 1071

Del Rio, Texas 78840

Val Verde County Commissioners Court Val Verde County Courthouse Del Rio, Texas 78840

> City of Del Rio Drawer DD Del Rio, Texas 78840

September 1974

Prepared by:

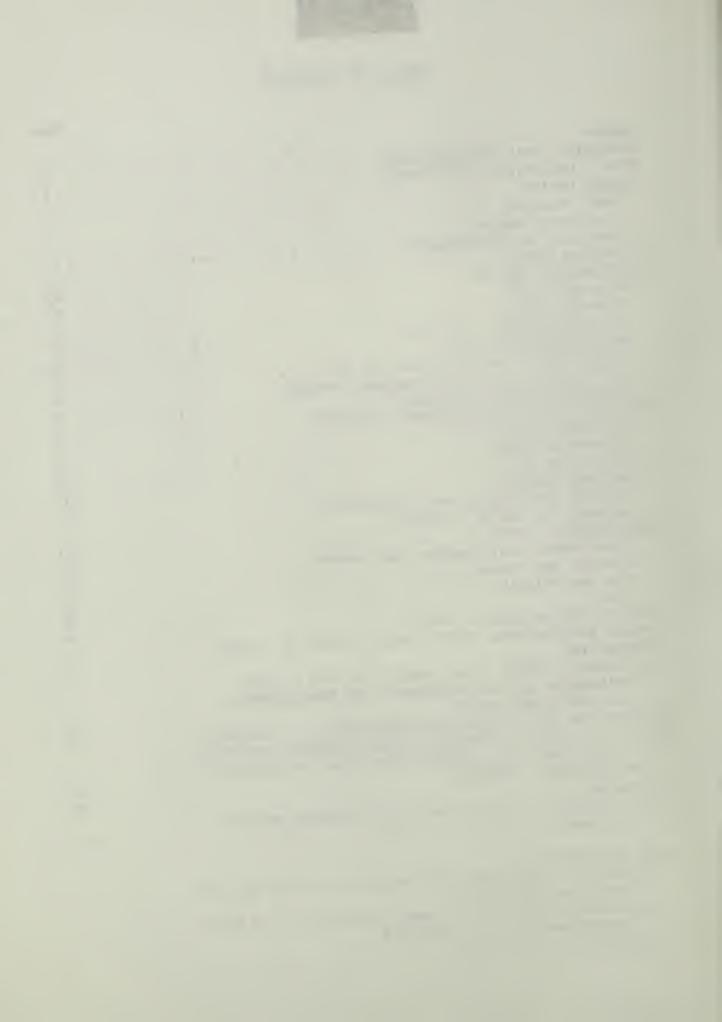
UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Temple, Texas 76501



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USDA FINAL ENVIRONMENTAL IMPACT STATEMENT

The San Felipe Creek Watershed Project Val Verde County Texas

Prepared in Accordance with Sec. 102(2)(C) of P. L. 91-190

SUMMARY

- I. Final
- II. Soil Conservation Service
- III. Administrative
 - IV. Description of Action:

A plan for watershed protection and flood prevention in Val Verde County, Texas, will be carried out by the sponsoring local organizations with assistance from the Soil Conservation Service, USDA, under the authority of Public Law 566, 83rd Congress, 68 Stat. 666, as amended. The plan proposes that adequate land treatment be accomplished on about 2,520 additional acres and one single-purpose floodwater retarding structure be constructed during a three-year installation period.

- V. Summary of Environmental Impact and Adverse Environmental Effects:
 - 1. With the application of the planned land treatment, the level of accomplishment for needed conservation measures and practices is expected to reach 88 percent.
 - 2. With the application of improved irrigation facilities, more efficient use of water can be realized.
 - 3. Erosion and sediment will be reduced by application of land treatment measures.
 - 4. Total average annual acres flooded will be reduced 91 percent.
 - 5. Average annual acres flooded in Del Rio will be reduced 95 percent.
 - 6. Floodwater damages will be reduced by at least 99.5 percent from all flood events up to and including the 100-year frequency event.
 - 7. Flood protection in flood-prone agricultural areas will insure more dependable crop yields and help stabilize the agricultural sector of the local economy.
 - 8. Property owners will be provided the opportunity to improve their homes without fear of increased flood damages.
 - 9. The City of Del Rio will have the opportunity to improve and intensify public recreational facilities in its public park area without concern to flood damages thus improving civic pride and human environment.

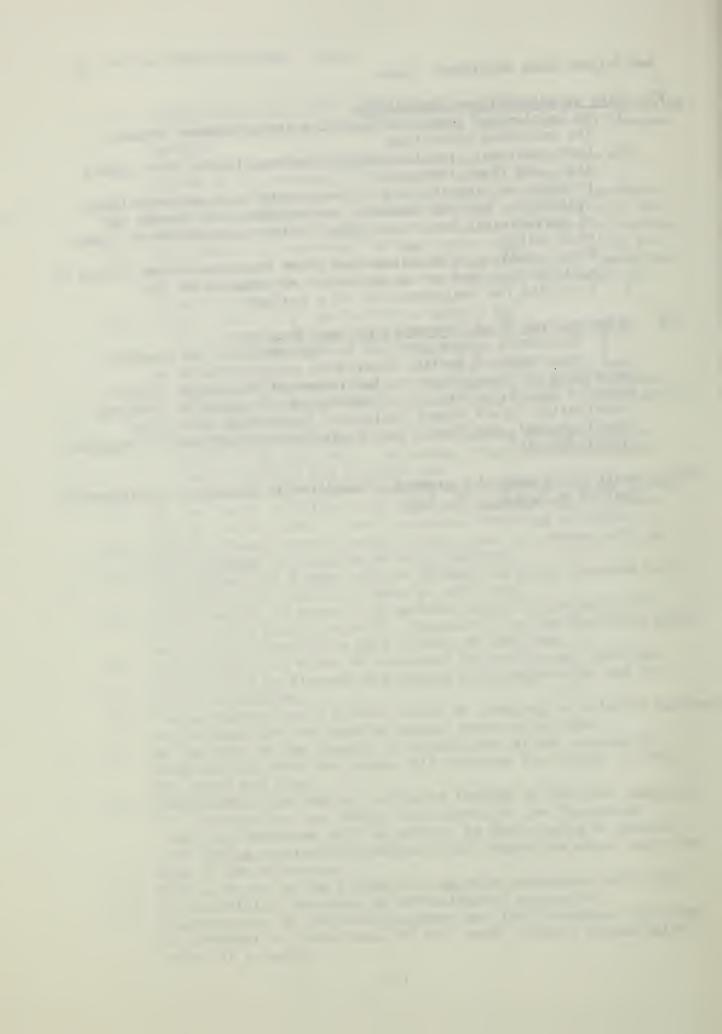
- 10. Projects by local civic organizations concerned with beautifying and preserving aesthetic values in the flood plain will become feasible.
- 11. Public health and sanitation facilities and conditions will improve in the presently flood-prone areas of Del Rio.
- 12. The installed project will provide local government incentive to restrict and control potential sources of pollution in the area of the watershed above the floodwater retarding structure.
- 13. Approximately 20 man-years of employment will be required for installation of the floodwater retarding structure. Operation and maintenance of the structure will provide opportunities for employment.
- 14. Provide better fish and wildlife habitat by:
 - a. Improving water quality in San Felipe Creek and the Rio Grande River for fish production:
 - b. Supplying more food for upland game animals with land treatment measures such as conservation cropping systems, deferred and proper grazing, and brush control with wildlife considerations;
 - c. Furnishing temporary water for wildlife in the sediment pool of the floodwater retarding structure and permanent water in tanks and troughs; and
 - d. Improving flood plain conditions for ground-nesting birds.
- 15. Air and water pollution from dust and sediment will increase during construction of the floodwater retarding structure.
- 16. Utility lines, private roads, fences, and two houses will require changes in location or modifications.
- 17. The contents of a barn, and two houses and their contents and occupants (two families), must be relocated.
- 18. Approximately 40 acres of rangeland vegetation and wildlife habitat will be destroyed by construction of the emergency spill-ways and placement of a rock blanket on the dam.
- 19. Approximately 52 acres of rangeland vegetation and wildlife habitat will be altered by clearing woody vegetation and borrowing operations.
- 20. Indiscriminate brush control could be damaging to wildlife habitat in the watershed by removing needed protective cover.
- 21. An increase in the density of grass cover at the expense of seed-bearing forbs and weeds will decrease the amount of food for quail and dove.
- 22. Unsalvaged archeological resources located in the area required for construction and proper functioning of the floodwater retarding structure will be subject to disturbance or destruction during construction and periodic inundation after installation of the structure.
- 23. Public access to the floodwater retarding structure site would be potentially dangerous to archeological resources.
- 24. Concentration of livestock movement and land treatment requiring the movement or disturbance of soil would disrupt archeological sites, if present.

VI. List of Alternatives Considered:

- 1. An accelerated program of applying land treatment measures for watershed protection
- 2. Land treatment, restrictions on construction in flood hazard area, and flood insurance
- 3. Purchase of urban flood plain areas with relocation of homes, businesses, and improvements, and changing the present use of agricultural land to one that is less susceptible to damage by flooding
- 3. Flood proofing of buildings and other improvements and change in agricultural land use as stated in Alternative No. 3
- 5. Foregoing the implementation of a project

VII. Agencies From Which Comments Have Been Received:

- U. S. Department of the Army; U. S. Department of the Interior; U. S. Department of Health, Education, and Welfare; U. S. Department of Transportation; Environmental Protection Agency; Advisory Council on Historic Preservation; Division of Planning Coordination (State agency designated by Governor and State Clearinghouse); and Middle Rio Grande Development Council (Regional Clearinghouse)
- VIII. Draft Environmental Statement transmitted to Council of Environmental Quality on November 30, 1973.



USDA SOIL CONSERVATION SERVICE

FINAL ENVIRONMENTAL IMPACT STATEMENT for San Felipe Creek Watershed

Val Verde County, Texas

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83rd Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Devils River Soil and Water Conservation District
Val Verde County Commissioners Court
City of Del Rio

PROJECT OBJECTIVES AND PURPOSES

There is a history of extensive flood damage to residential and business properties, city streets, public recreational facilities, and utilities in Del Rio and to agricultural properties along San Felipe Creek. Representatives of the Commissioners Court of Val Verde County, the City of Del Rio, and the Devils River Soil and Water Conservation District observed the social and economic effects and endeavored to chart a course of action to solve these problems. Subsequently, these sponsoring local organizations requested the assistance of the Soil Conservation Service. Meetings and studies were conducted to discuss and comprehend watershed problems. After determining the locations and extent of the problems and considering possible solutions, project objectives were formulated. Watershed protection and flood prevention were the principal objectives expressed by the sponsoring local organizations.

The following specific objectives were agreed to:

- 1. Reduce erosion and increase rainfall infiltration by establishing land treatment measures which would contribute directly to watershed protection and flood prevention. The goal is to increase the establishment of needed land treatment measures from the present 80 percent to 88 percent during the three-year installation period.
- 2. Attain a 70 to 75 percent reduction in total average annual agricultural damages.
- 3. Provide protection from the 100-year frequency flood to residential and business properties in Del Rio and attain at least 90 percent reduction in average annual flood damages in the urban area.

The sponsors considered the impacts, both favorable and adverse, in developing the plan for meeting the project objectives. The objectives selected were those that will contribute to the conservation, development, and productive use of the watershed's soil, water, and related resources so that watershed residents can enjoy:

QUALITY IN THE NATURAL RESOURCE BASE FOR SUSTAINED USE

QUALITY IN THE ENVIRONMENT TO PROVIDE ATTRACTIVE, CONVENIENT, AND SATISFYING PLACES TO LIVE, WORK, AND PLAY

QUALITY IN THE STANDARD OF LIVING BASED ON COMMUNITY IMPROVEMENT AND ADEQUATE INCOME

The sponsors selected measures which will help achieve these objectives and also included measures to minimize adverse impacts wherever practicable.

PLANNED PROJECT 1/

The project measures to be installed in order to achieve the sponsors' objectives consist of a combination of conservation land treatment measures and a floodwater retarding structure. The objective of the land treatment phase is the use of each acre within its capabilities and the treatment of each acre in accordance with its needs for long-term production and conservation of soil, water, plant, and related resources. The structural measure will be installed to provide flood protection to the flood plain lands.

Land Treatment

Conservation of soil, water, plant, and wildlife resources is an important element of a watershed protection and flood prevention project. Treatment and use of land within the watershed influences the degree to which conservation objectives are attained.

Conservation land treatment consists of individual measures and practices or a combination of measures and practices that are planned, installed and maintained on privately owned land by individuals or groups of land users or by local organizations. Land treatment measures planned for the watershed are those that will contribute directly to the preservation and enhancement of the environment in the watershed. Emphasis will be given to those measures which will reduce soil and water losses, reduce flooding, and preserve or improve the fish and wildlife resources of the watershed.

^{1/} All information and data, except as otherwise noted by reference to source, were collected during watershed planning investigations by the Soil Conservation Service, U. S. Department of Agriculture.

Conservation land treatment has been, and will be, applied on privately owned lands within the watershed. The land user will make the decision on the use of his land and the treatment measures which he will install.

Adequate conservation land treatment will be applied on about 2,520 additional acres during a three-year installation period, of which 2,280 acres are rangeland, 150 acres are cropland, and 90 acres are pastureland and hayland. These measures will be applied in addition to those already applied on approximately 24,060 acres to achieve effective treatment on about 88 percent of the agricultural land in the watershed.

Conservation measures to be applied on cropland include conservation cropping systems, crop residue use, irrigation land leveling, irrigation systems, and irrigation water management.

Conservation cropping systems involve growing crops in combination with needed cultural and management measures that reduce erosion and protect the soil. Crop residue management utilizes plant residue left on or near the soil surface to protect cultivated lands during critical erosion periods. Irrigation land leveling is the reshaping of the land surface to be irrigated to planned grades. Irrigation systems involve the installation of water control structures and field ditches for the efficient distribution of irrigation water. Irrigation ditch and canal lining increases the efficiency of irrigation systems by reducing the loss of water from seepage and evaporation. Irrigation water management is accomplished by determining and controlling the rate, amount, and timing of irrigation water application to soils to supply plant water needs in a planned and efficient manner.

Conservation measures which will be applied on pastureland and hayland include the planting or seeding of adapted species of perennial forage plants and their management for sustained production and use.

Rangeland will be managed to maintin or improve existing vegetation. Conservation measures to be applied on rangeland include proper grazing use, range seeding, planned grazing systems, brush management, and deferred grazing. Wells, troughs, and pipelines for additional livestock and wildlife water will be installed. Land users will be provided technical assistance in designing watering facilities for use by wildlife as well as livestock. To date, 153 troughs and tanks have been installed. Ponds for livestock water have limited application in the watershed due to the impervious nature of the soils. One pond has been installed to date. Proper grazing use, planned grazing systems, and deferred grazing are range management practices which involve the grazing of forage plants at periods of time and at intensities which are compatible with the physiological needs of plants. Application of these practices contribute to continued growth and survival of desired plant species. Range seeding is the establishment of adapted plants on rangeland. Range seeding usually follows

brush management on lands that do not have an adequate seed source to obtain a cover of plants through natural succession within a reasonable period of time.

Brush management involves the control or manipulation of stands of brush to allow the establishment or growth of desired plant species. About 1,000 acres of brush management is expected to be accomplished during the project installation period. About one half of this amount will be control of regrowth on areas which have previously been controlled. Dozing and stacking is the most common method of brush management practiced. ing and stacking usually results in a very limited root kill of woody species, and regrowth often begins within thirty days following control. Most brush management is carried out in an attempt to reduce the density of woody plants and to make them more available for use by grazing animals. Elimination of woody species is neither practical nor desirable in the watershed. Management by dozing on species such as lotebush (Condalia obtusifolia) and guajillo (Acacia berlandieri) stimulate new growth and provide forage within the reach of livestock and deer. The resulting decrease in canopy cover and competition for sunlight, water, and plant nutrients allows an increase in desirable forbs and grasses. Most brush management practiced is confined to highly productive clay loam and clay flat range sites. A range site is an area of land having a combination of edaphic, climatic, topographic, and biotic factors that is significantly different from adjacent areas. - Brush management cannot be economically applied on sites such as the shallow ridge site which has a relatively low potential for forage production. Brush management by range sites results in patterns of brush interspersed with open areas.

Wildlife upland habitat management on rangeland will consist primarily of brush management applied with wildlife considerations and proper grazing use of plants having wildlife value.

District cooperators will be provided technical assistance in the application of brush management practices which preserve existing wildlife habitat. On land which is utilized by livestock and wildlife, a compromise is often necessary to meet the needs of all animals. Ideally enough brush should be removed to significantly increase livestock forage production and still retain enough browse and cover for wildlife. Land users who seek optimum wildlife production usually control brush on about 50 to 60 percent of their land. Landowners who seek to optimize livestock production and still retain significant wildlife values should leave at least 30 percent of their land in brush. A brush management program must be carefully planned to fit the existing conditions on a particular land unit. Strips and blocks which alternate with uncontrolled areas are recommended. Steep slopes and stream courses are prime wildlife habitat areas which will be designated for protection in planned programs of brush management.

^{1/} Society for Range Management, 1964, A Glossary of Terms Used in Range Management, Denver, Colorado.

Grazing use by domestic livestock at a level which results in proper use of plants having wildlife value will be planned on rangeland. Conservation plans will contain data on key wildlife plant species as well as species of value for domestic livestock. Recommended degrees of use for these key species will be provided to land users. Reductions in livestock numbers and reductions in wildlife numbers, particularly deer, may be necessary when excessive use occurs on key forage plants.

Structural Measure

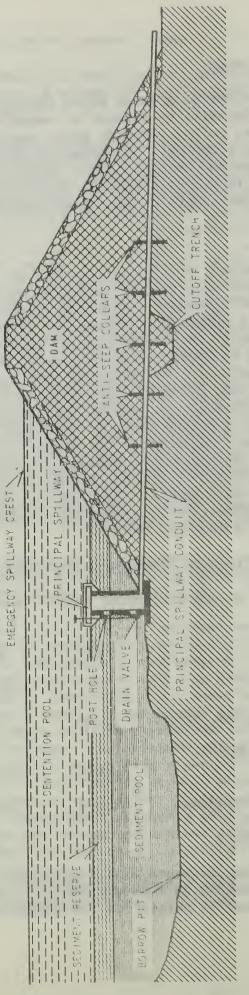
One floodwater retarding structure will be constructed in San Felipe Creek watershed. The location of the structure to be installed is shown on the project map (Appendix C). The floodwater retarding structure will be an earth dam or embankment with a principal spillway and plunge basin, two emergency spillways, a floodwater retarding pool, and a sediment pool. The function of the embankment is to temporarily impound floodwater upstream in the retarding pool. The water in the retarding pool flows, during a predetermined period, through the principal spillway which is a concrete vertical inlet and a conduit through the base of the embankment. Principal spillway flow is released into a plunge basin on the downstream side of the embankment. The plunge basin dissipates the energy of the principal spillway flow. The emergency spillways are designed to convey runoff that exceeds the planned capacity of the floodwater retarding pool past the embankment and back to the stream channel. The sediment pool is capacity below the principal spillway elevation allocated for storage of sediment expected to accumulate during a 100-year period.

Figure 1 shows a section of a typical floodwater retarding structure.

Pertinent physical parameters of the floodwater retarding structure are as follows:

Height of Dam	ft.	54
Length of Dam	ft.	2,890
Sediment Pool - lowest ungated outlet	acres	52
Floodwater Retarding Pool and Sediment Reserve Pool	20703	206
Sediment Reserve FOOI	acres	396
Area in Dam and Emergency Spillways	acres	40
Average Depth of Sediment Pool	ft.	6

The planned floodwater retarding structure will temporarily store or retard 2.60 inches of runoff from 35.35 square miles of drainage area. It will control runoff from about 75 percent of the entire watershed and



SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE Figure 1

approximately 98 percent of the drainage area above Del Rio. The total storage capacity of the structure is 4,901 acre-feet of which 1,056 acre-feet are for sediment storage and 3,845 acre-feet are for floodwater retarding storage.

Major factors which will affect construction of the floodwater retarding structure will be rock excavation in the emergency spillways, zoning of fill material within the embankment, and permeable deposits of gravel and porous limestone within the embankment foundation area.

The embankment will be comprised of silty clay, gravelly clay, silty gravel, and limestone. Sufficient volumes of silty clay and gravelly clay for construction of a very slowly permeable central embankment section are available within short haul distances. The remainder of the embankment will be comprised primarily of silty gravel and limestone. It is anticipated that a limestone blanket will cover the embankment. The upper limit of the limestone blanket will be determined by the yield of durable rock from emergency spillway excavation and the durable gravel and cobble content in common excavation. All embankment fill materials will be obtained from the sediment pool area and required emergency spillway excavation.

The embankment foundation area is characterized by the presence of flood plain and stream terrace deposits of calcareous clay, silt, and gravel containing rapidly permeable horizons. These materials have sufficient shear strength and low settlement potential. The alluvium is underlain at relatively shallow depths by hard, thin to massively bedded, irregular limestone. A sinkhole in the forebay area of the east emergency spillway, evidence of extensive fracturing at limestone exposures, and spring flow about 500 feet downstream from the centerline of the embankment are good indicators that foundation drains will be needed.

The principal spillway for the floodwater retarding structure will be a monolithic rectangular reinforced concrete inlet and a prestressed concrete-lined steel cylinder pipe outlet barrel on a compressible soil foundation. Principal spillway flow will discharge into a rock-lined plunge basin.

The structure is designed to store sediment expected to accumulate in the sediment and floodwater retarding pools during a 100-year period. The principal spillway crest will be set at the 100-year sediment pool elevation. As required by Texas Water Rights Statutes, the principal spillway will be ported at the elevation which will limit impoundment of water to 200 acre-feet. However, due to anticipated high rates of seepage in the embankment foundation area, it is not expected that the structure will hold water for significant periods of time. The ports at this elevation will be the lowest ungated outlet. Capacity created in the sediment pool by excavation of earth-fill materials for the embankment will be included in the limitation of 200 acre-feet.

Although the structure is not expected to impound water, it will have provisions to release water in order to perform maintenance, and if it becomes necessary, to avoid encroachment upon downstream water rights.

Both emergency spillways, which are approximately 0.75 to 0.90 mile upstream from San Felipe Springs, will have erosion resistant rock crests and forebays. Exit channels at finished grade will be mostly underlain by rock at shallow depths. The principal spillway capacity and floodwater detention storage in the floodwater retarding structure will provide a one-percent chance for emergency spillway use.

Presently, because the floodwater retarding structure is not expected to impound water in the sediment pool, the sponsors have no plans for using the site for recreational purposes and do not intend to provide public access to the area. However, should the site in the future be suitable and needed for recreational purposes, the Val Verde Commissioners Court will obtain approval from the Texas Department of Health and appropriate local health agencies and obtain, as required by Texas State Statutes, pertinent water rights permits from the Texas Water Rights Commission.

The sponsoring local organizations are fully aware that the watershed area above San Felipe Springs is within the recharge zone. They are also aware of the possibility that the sinkhole in the emergency spillway forebay area and many other ground water intake points and San Felipe Springs are hydrologically connected. Expected urban and industrial expansion will result in increased potential sources of pollution.

The sponsors are vitally interested in working with the Texas Water Quality Board in taking the necessary steps to protect the water quality.

All applicable state laws will be complied with in the design and construction of the structural measure as well as those pertaining to the storage, maintenance of quality, and use of water.

The floodwater retarding structure is scheduled to be constructed during the second year of a three-year project installation period. Due to the relative locations of the floodwater retarding structure site and San Felipe Springs, the implementation of standards and measures for preserving water quality in San Felipe Springs are of paramount importance.

During construction, contractors will be required to adhere to strict standards set forth in a construction contract to protect the environment by minimizing soil erosion and water and air pollution. These standards will be in compliance with U. S. Department of Agriculture, Soil Conservation Service Engineering Memorandum 66, "Guidelines for Minimizing Soil Erosion and Water and Air Pollution During Construction". Excavation and construction operations will be scheduled and controlled to prevent exposure of extraneous amounts of unprotected soil to erosion and the

resulting translocation of sediments. Measures to control erosion will be uniquely specified for the work site and will include, as applicable, use of temporary vegetation or mulches, diversions, mechanical retardation of runoff, and traps. Harmful dust and other pollutants inherent to the construction process will be held to minimum practical limits. Haul roads and excavation areas, and other work sites will be sprinkled with water as needed to keep dust within tolerable limits. Contract specifications will require that fuel, lubricants, and chemicals be adequately labeled and stored safely in protected areas, and disposal at the work site will be by approved methods and procedures. Clearing and disposal of brush and vegetation will be carried out in accordance with applicable laws, ordinances, and regulations in respect to burning. The contract will set forth specific stipulations to prevent uncontrolled grass or brush fires. Disposal of brush and vegetation will be by burying, hauling to approved off-site locations, or controlled burning, as applicable.

Stringent requirements for safety and health in conformance with the Construction Safety Act will be included in the construction contract.

Necessary sanitary facilities, including garbage disposal facilities, will be located to prohibit such facilities from being a pollution hazard to live streams, wells, or springs in conformance with Federal, State, and local water pollution control regulations. Special provisions in the construction contract will incorporate by reference, and thereby make the contract provisions conform to "Safety and Health Regulations for Construction, Part I and Part II," U.S. Department of the Interior, Bureau of Reclamation. Soil Conservation Service guidelines that provide for the incorporating of the Bureau of Reclamation regulations into construction contracts are in the "Soil Conservation Service Administrative Services Handbook, Chapter 6". Conformance to all environmental control requirements will be monitored constantly by a construction inspector who will be onsite during all periods of construction operation.

Efforts will be made to avoid creating conditions which will increase populations of vectors which affect public health conditions. Prevention and control measures will be implemented, if needed, in cooperation with appropriate Federal, State, and local health agencies to suppress proliferation of vectors such as aquatic insects, terrestrial arthropods and rodents, etc. that could occur with installation of the structure.

The watershed work plan has been coordinated with the Texas State Historical Commission and the National Park Service, USDI. The Texas State Historical Commission has advised that the installation of the project will not encroach upon any known historic places or any planning by the Commission for historic preservation. Investigations by the Texas Archeological Survey, The University of Texas at Austin, conducted under contract with the National Park Service, indicate that installation of the

project will encroach on known archeological values. In compliance with Public Law 86-523, the Secretary of the Interior, through the appropriate National Park Archeological Center, will be kept informed of the construction schedule so that the Secretary can initiate whatever salvage or preservation of archeological resources deemed appropriate. The Texas Archeological Survey estimated the cost to effectively reduce the loss of endangered locations through archeological excavations would be about \$16,500.

The minimum land rights required will be those necessary to construct, operate, maintain, and inspect the floodwater retarding structure; to provide for flowage of water, in, upon, or through the structure; and provide for the permanent storage and temporary detention, either or both, of any sediment or water.

Installation of the floodwater retarding structure will require change in location or modifications of utility lines, private roads, fences, and two houses. There are several private road crossings below the planned floodwater retarding structure which will be made impassable by release flows. The private road crossings will be improved to make them passable during prolonged release flows or alternate routes will be provided for use during periods of inundation.

Under present conditions, the acquisition of land rights needed for the installation of the floodwater retarding structure will result in the displacement of two persons from one owner-occupied dwelling and three persons from one tenant-occupied dwelling and the relocation of contents of one barn which is an integral part of a farm operation. Both dwellings will be moved only a short distance away from their present sites and upon the same property. Occupants will be relocated in the same dwellings they now occupy in accordance with provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970. No other displacement or relocation is apparent at this time.

The installation of the floodwater retarding structure will require the commitment of a total of 488 acres of land. The dam, emergency spillways, and sediment pool will need 200 acres of the total area required. Vegetation will be cleared from 92 acres (40 acres for dam and emergency spillways and 52 acres in the sediment pool below the lowest ungated outlet elevation). Woody vegetation on the area to be cleared consists of the following species: mesquite (Prosopis juliflora var. glandulosa), texas colubrina (Colubrina texensis), spiny hackberry (Celtis pallida), texas persimmon (Diospyros texana), lotebush, prickly pear (Opuntia spp.), catclaw (Acacia greggi), guayacan (Porlieria angustifolia), ceniza (Leucophyllum frutescens), whitebrush (Aloysia lycioides), yucca (Yucca spp.), pitcher sage (Jalvia pitcheri), hackberry (Celtus laevigata), huisache (Acacia farnesiana), and desert yaupon (Schaefferia cuneifolia). The area

has a 35-40 percent canopy. Herbaceous species are primarily red grama (Bouteloua trifida), threeawns (Aristida spp.), texas wintergrass (Stipa leucotricha), plains bristlegrass (Setaria macrostachya), texas tridens (Tridens texanus), mallows (Malva spp.), western ragweed (Ambrosia psilostachya), nightshades (Solanum spp.), and orange zexmenia (Zexmenia hispida). Clearing in the sediment pool area above the lowest ungated outlet elevation is not warranted because the floodwater retarding structure is not expected to permanently impound water. Native grasses in the sediment pool will be disturbed as little as possible. Because the sediment pool is not expected to provide a permanent or dependable impoundment of water. conditions should be favorable for the reestablishment of annual weeds, existing perennial grasses, or seeding of other desirable vegetation for wildlife cover and food in the area. In addition to 160 acres at the highest elevation of the sediment pool, 288 acres will be required for the floodwater retarding pool. Except for periodic inundation from floodwater, vegetation on this area will not be disturbed.

Operation and Maintenance

Planned land treatment measures will be maintained by landowners and operators of farms on which measures are applied under agreement with the Devils River Soil and Water Conservation District. Representatives of the district will periodically review the status of land treatment measures and provide technical assistance to land users to maintain needed measures.

The Commissioners Court of Val Verde County will be responsible for operation and maintenance of the floodwater retarding structure. Monies for operation and maintenance of the floodwater retarding structure will be supplied from the General Funds of the City of Del Rio and Val Verde County. These funds are supported by revenue from existing taxes. Each year the City of Del Rio and the Val Verde County Commissioners Court will budget sufficient funds for operation and maintenance.

A specific operation and maintenance agreement will be executed prior to issuance of an invitation to bid on construction of the floodwater retarding structure. The agreement will set forth the inspections to be made and the maintenance to be performed.

The floodwater retarding structure will be inspected at least annually and after each heavy rain by representatives of the Val Verde County Commissioners Court, the City of Del Rio, and the Devils River Soil and Water Conservation District. A Soil Conservation Service representative will participate in these inspections for a period of at least three years following construction. The Soil Conservation Service will participate in inspections as often as it elects to do so after the third year. Items of inspection will include, but will not be limited to, conditions of principal spillway and its appurtenances, emergency spillways, the earth fill, and inspection of areas, both upstream and downstream from the structure, for evidence of blow-outs or sink holes which

might develop due to the head of water caused by flooding of the pool area. A written report will be made of each inspection. A copy of each report will be provided by the Val Verde County Commissioners Court to a designated Soil Conservation Service representative within ten days of the date on which the inspection was made.

Upon completion of the floodwater retarding structure by the contractor, subject to the establishment of vegetation, the Val Verde County Commissioners Court will assume responsibility for maintenance of the structure. It will perform promptly, or have performed promptly, all maintenance of the structure as determined to be needed by either the sponsors or the Soil Conservation Service, including that required to prevent soil erosion and water pollution.

Maintenance of the floodwater retarding structure will consist of items such as controlling undesirable vegetation by mowing, hand cutting or using herbicides; painting metal parts; and repairing eroded areas. This should be minimal since the emergency spillways and most of the embankment surface will be rock. The mowing operations for the most part will be done with a farm-type tractor and shredder.

The commissioners court will control, in accordance with state regulations, the handling, storage, and application of herbicides and pesticides that may be necessary for operation and maintenance of the floodwater retarding structure. Approved reagents and compounds will be used. Their application will be compatible with current laws regulating their use and in standards established by appropriate controlling agencies that will contribute to the maintenance of high water quality in runoff and in San Felipe Springs. In addition to sound and prudent judgement, ordinances and standards concerned with the disposal or storage of unused chemicals, empty containers, contaminated equipment, etc., will be observed and applied.

The Soil Conservation Service, through the Devils River Soil and Water Conservation District, will participate in operation and maintenance only to the extent of furnishing technical assistance to aid in inspections and technical guidance and information necessary for the operation and maintenance program.

Provisions will be made for unrestricted access by representatives of the sponsoring local organizations and the Soil Conservation Service to inspect the structural measure and its appurtenances at any time and for sponsoring local organizations to perform operation and maintenance. Easements insuring this unrestricted ingress and egress will be furnished by the sponsoring local organizations.

The Val Verde County Commissioners Court will maintain a record of all maintenance inspections made, maintenance performed, and cost of such maintenance and have it available for inspection by Soil Conservation Service personnel.

The necessary maintenance work will be accomplished by contracts, force accounts, or equipment owned by the sponsoring local organizations.

Project Costs

The estimated costs for installation of the project are presented in the following tabulation:

Installation Cost	: Estima : Public	ted Cost (D	ollars) <u>1</u> /	
Item	: Law 566	: Other	: Total	
Land Treatment Installation Technical Assistance	<u>-</u>	14,000 18,300	14,000 18,300	
Subtotal	-	32,300	32,200	
Structural Measure Construction Engineering Services Relocation Payments Project Administration Land Rights	406,560 20,330 1,740 59,010	310 1,900 53,030	406,560 20,330 2,050 60,910 53,030	
Subtotal	487,640	55,240	542,880	
Total Project	487,640	87,540	575,180	

ENVIRONMENTAL SETTING

Physical Data

The San Felipe Creek watershed lies within the Rio Grande River Basin Region and comprises an area of 30,080 acres or about 47 square miles in southwestern Texas. The watershed is approximately 150 miles west of San Antonio and 140 miles directly east of Big Bend National Park. San Felipe Creek rises in southeastern Val Verde County about 10 miles northeast of the City of Del Rio and flows southward through Del Rio

The estimated average annual cost of operation and maintenance for the floodwater retarding structure is \$200. Average annual benefit to cost ratio is 6.6:1.0.

^{1/} Price Base: 1972

into the Rio Grande. Major tributaries are Calaveras Creek and an unnamed tributary which joins San Felipe Creek from the northeast just upstream from Del Rio (see Appendix C).

The watershed lies within two major land resource areas. The upper 35 percent lies within the Edwards Plateau Land Resource Area and is primarily within the outcrop of hard, massive to medium bedded Lower Cretaceous limestone of the Buda Limestone formation. The area is characterized by shallow, stony and gravelly soils and rolling topography. The remaining 65 percent of the watershed lies within the Rio Grande Plain Land Resource Area. of the bedrock is covered by thick alluvium deposited by ancient streams which flowed southward from the Edwards Plateau. The older deposits (Uvalde Gravel) have been dissected by erosion. As a result, the Uvalde Gravel presently occupies topographically high areas. Alluvium of the younger Leona Formation lies at lower elevations and has been only slightly altered by erosion. The topography is mostly gently rolling to nearly level with narrow bands of steep slopes along valley walls. area of badland-like topography immediately to the southeast of Del Rio. Here, the Grayson Marl formation rises above the alluvial deposits and is undergoing accelerated geologic erosion. This area is drained by Calaveras Creek.

Elevations within the watershed range from about 1,330 feet above mean sea level along the northern divide in the Edwards Plateau to about 870 feet at the lower end of the watershed where San Felipe Creek enters a previous channel of the Rio Grande.

The Georgetown Limestone formation, which underlies the watershed, has undergone considerable solution. Also, fracturing of the limestone beds is prevalent in some areas and was influenced by the westward extension of the Balcones Fault Zone. San Felipe Springs, on the eastern side of Del Rio, issue from the Georgetown Limestone into San Felipe Creek. The average discharge of the springs is greater than 65 million gallons per day. The flow of San Felipe Creek from the springs downstream to the Rio Grande is perennial. San Felipe Creek is intermittent upstream from the springs.

A sufficient supply of good quality municipal and industrial water for Del Rio and nearby Laughlin Air Force Base is obtained from wells in the Georgetown Limestone at San Felipe Springs. There is no immediate threat to the quality or quantity of water supply for Del Rio and Laughlin Air Force Base. Texas Department of Health Laboratories chemical analyses indicate the iron, manganese, sulfate, chloride, fluoride, and nitrate content of the spring water is within the Texas Department of Health standards for drinking water. According to these analyses, the pH is 7.9 and total hardness as Ca CO₃ ranges from 221 to 241 milligrams per liter. Presently there are no available laboratory analysis data on runoff from the watershed above the springs. However, the high quality of water issuing from the springs indicates there is no significant contamination from runoff above the area. The present land use of the area contributing runoff to the vicinity of the springs is rangeland and there are no sources of pollution such as large cattle feedlots or urban development.

Important mineral resources in the watershed are limestone, gravel, and clay.

The climate is semi-arid. The average annual rainfall at Del Rio is about 18 inches. More than 50 percent of the average annual rainfall occurs in May, June, September, and October. Summers are hot and winters are generally mild and quite dry but subject to rapid temperature changes with the passage of cold fronts. Temperatures range from a mean maximum of 94 degrees Fahrenheit in July to a mean minimum of 40 degrees in January. The normal growing season, extending from February 12 through December 9, is 300 days.

Soils of the watershed, in general, are calcareous. Permeabilities range from very slow (less than 0.06 inches per hour), slow (0.06-0.20 inches per hour), and moderately slow (0.20-0.60 inches per hour) to moderate (0.60-2.00 inches per hour). However, a majority of the soils have moderate permeability. Edwards Plateau soils are mostly shallow to very shallow in depth (0 to 10 inches and 10 to 20 inches respectively), fine textured, and stoney or gravelly. The Rio Grande Plain soils have fine textured surfaces and range from deep (greater than 40 inches) to very shallow in depth. Occurrences of gravel in both the surface and subsurface horizons and indurated caliche in subsurface horizons are common. The predominant soils in the watershed are silty clay loams of the Reagan, Laredo, Reynosa, and Uvalde series; silt loam of the Rio Grande series; gravelly loams of the Zapata, Olmos, and Quemado series; and stony clay loam of the Ector series.

Land use within the watershed is as follows:

Land Use	Acres	Percent
Cropland	280	0.9
Pastureland and Hayland	200	0.7
Rangeland	23,689	78.7
Miscellaneous *	5,911	<u>19.7</u>
Total	30,080	100.0

^{*} Includes roads, highways, railroad rights-of-way, urban areas, farmsteads, stream channels, etc.

At present, about 280 acres within the watershed are irrigated. Irrigation water is obtained from San Felipe Springs and is of good quality. Irrigated crops consist mainly of alfalfa and Johnsongrass which are well adapted to the soils on which they are grown. Also, there is some supplemental irrigation of a pecan orchard.

^{1/} U. S. Weather Service, Climatology Data

There is no activity relative to drainage in the watershed.

The primary range sites in the watershed are clay flat, clay loam, shallow ridge, and loamy bottomland. The clay flat site occurs on nearly level to gently sloping plains. The climax plant community on this site was an open grassland with scattered woody shrubs. The clay leam range site occurs on nearly level to gently sloping areas. The climax plant community of this site was an open grassland with an occasional mesquite tree or woody shrub. Woody species composed five percent or less of the climax vegetation. grasses were dominant and some climax forbs existed. The shallow ridge range site occurs on low gently sloping ridges and plains. The climax plant community was an open grassland with a variety of scattered woody shrubs and perennial forbs. Woody species comprised about ten percent of the climax community. The loamy bottomland range site occurs on bottomlands and in valleys along major streams and tributaries. Climax vegetation on the site is characterized as a grassland with shrubs and trees along major stream channels. The density of woody vegetation varies depending on edaphic topographic, and natural biotic factors.

Climax grasses which comprised significant amounts of the original flora of the area were plains lovegrass (Eragrostis intermedia), twoflower trichloris (Trichloris crinita), fourflower trichloris (Trichloris pluriflora), arizona cottontop (Trichachne californica), pinhole bluestem (Andropogon perforatus), silver bluestem (Andropogon saccharoides), plains bristlegrass (Setaria macrostachya), buffalograss (Buchloe dactyloides), curlymesquite (Hilaria belangeri), sideoats grama (Bouteloua curtipendula), pink pappusgrass (Pappophorum bicolor), whiplash pappusgrass (Pappophorum mucronulatum), tobosa (Hilaria mutica), vine-mesquite (Panicum obtusum), alkali sacaton (Sporobolus airoides), big sacaton (Sporobolus wrightii), white tridens (Tridens albescens), lovegrass tridens (Tridens eragrostoides), slim tridens (Tridens muticus), green sprangletop (Leptochloa dubia), yellow indiangrass (Sorghastrum nutans), and canada wildrye (Elymus canadensis).

Woody species which were found in the climax plant communities in the uplands include guajillo, texas kidneywood (Eysenhard angustifolia), rang krameria (Krameria parvifolia var. glandulosa), vine ephedra (Ephedra antisyphilitica), falsemesquite (Calliandra eriophylla), mesquite, guayacan, skunkbush (Rhus trilobata), desert yaupon, littleleaf sumac (Rhus microphylla) texas colubrina, feather dalea (Dalea formosa), live oak (Quercus virginiana), ceniza, blackbrush (Acacia rigidula); and spiny hackberry, elm (Ulmus spp.), hackberry, pricklypear, grape (Vitus spp.), greenbriar (Smilax spp.), mesquite, bumelia (Bumelia spp.), and devilweed aster (Aster spinosus) were the primary species found adjacent to stream courses.

Some important forbs found in climax plant communities included bundleflower (Desmanthus spp.), bushsunflower (Simsia calva), orange zexmenia, catclaw sensitivebriar (Schrankia uncinata), eveningprimrose (Oenothera spp.), menodora (Menodora spp.), mallows, perennial croton (Croton spp.) mexican sagewort (Artemisia mexicana), engelmanndaisy (Engelmannia pinnatifida), gaura (Gaura spp.), and snoutbean (Rhynchosia spp.).

A more detailed listing of climax plants is provided in range site descriptions maintained in local Soil Conservation Service field offices.

The opening of Texas to settlement in 1820 and its annexation to the United States in 1845 brought a surge of immigration to the State. By 1880 grazing of livestock was widespread. Early livestock raisers had little concept of the grazing capacity of rangelands and heavy overuse of rangeland was common. This heavy use, combined with recurring droughts, caused a very significant change in natural vegetation. Some browse species with high forage value have been reduced by overgrazing. Most invading woody plants are adapted to dry climates and sparse cover. As the palatable grass species were destroyed by grazing and drought, the seeds of woody plants germinated and became established. The resulting rapid infestation of woody species replaced the formerly productive grasslands.

As a result of past land use, the vegetation within the watershed presently bears little resemblance to its climax condition and is generally in fair or poor condition.

As retrogression within plant communities occurred, climax grasses were replaced by red grama, threeawns, tumblegrass (Schedonnardus paniculatus), texas grama (Bouteloua rigidiseta), halls panicum (Panicum hallii), hairy tridens (Tridens pilosus), whorled dropseed (Sporobolus pyramidatus), annual grasses, and annual forbs. Low stoloniferous grasses such as curlymesquite and buffalograss increased due to their short growth form which enabled them to withstand heavy livestock grazing.

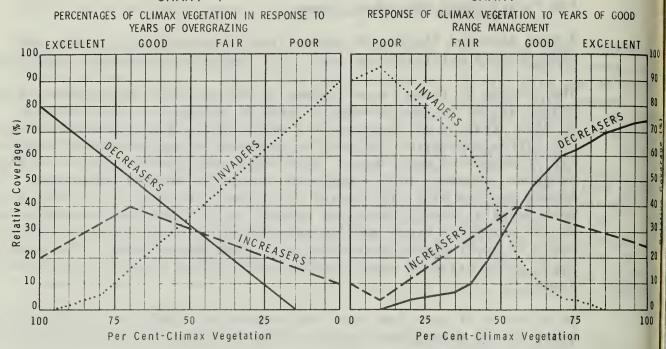
Woody species such as mesquite, lotebush, whitebrush, spiny hackberry, pencil cholla (Opuntia leptocaulis), leatherstem (Jatropha dioica), texas persimmon, mescalbean (Sophora secundiflora), agrito (Berberis trifoliolata), coyotillo (Karwinskia humboldtiana), catclaw, and pricklypear have increased or invaded and dominate many range sites.

Retrogression of grassland communities has resulted in greatly reduced forage production from rangelands. Range sites capable of yielding 2,500 to 3,500 pounds of forage in excellent condition often yield less than one-half this amount in poor or fair condition. The effect of overgrazing and proper grazing management on vegetation is illustrated by charts 1 and 2 on the following page. Chart 3 illustrates the grazing capacity of watershed range sites. Chart 4 illustrates the relative forage quality of plant species for various species of livestock and wildlife. Reduction of excess woody species through brush management is often necessary to permit restoration of poor and fair condition rangeland. Stands of woody vegetation which have invaded a site compete with remaining climax plants for water, sunlight, nutrients, and space. The removal or reduction of livestock grazing alone will often not permit desired vegetation to become reestablished.

RANGE CONDITION

CHART !

CHART 2



DECREASERS - Plants present in the potential plant community which decrease with overgrazing.

INCREASERS - Plants present in the potential plant community which initially increase with overgrazing but eventually decrease if overgrazing is prolonged.

INVADERS - Plants not present in the potential plant community but which encroach and occupy the area vacated by the decreasers and increasers under prolonged over-use.

CHART NO. 1

This chart illustrates the reaction of rangeland vegetation to prolonged periods of overgrazing. The more desirable plants decrease. Others present increase for a short time and then decrease as the grazing load shifts to them. Undesirable plants present only in trace amounts invade and occupy the area vacated by the original plants.

CHART NO. 2

POOR CONDITION

The invader plants increase in percent ground cover during the first few years when grazing a sessure is lightened or wholly removed. This increase continues as long as there is bare ground for this type of plant to occupy. The increaser plants are low in vigor and are slow to start spreading. Both increaser plants and the trace of decreaser plants begin to occupy more area as the cover and litter accumulates and plant vigor increases. At this stage, the less competitive invaders, such as annuals, begin to diminish and give way to plants of higher order.

FAIR CONDITION

The increaser plants continue to spread and compete more heavily for the water, nutrients, and light. Decreaser plants gain vigor, produce seed, and begin to spread more rapidly by establishing new plants by vegetative means. The invader species start to decline rapidly as competition becomes more and more severe.

GOOD CONDITION

Decreaser plants increase more rapidly. Invader species continue to be eliminated as competition with plants of higher ecological status becomes more severe. Increasers spread for a short time until competition with plants of higher rank force them to diminish gradually.

EXCELLENT CONDITION

Invader plants are soon reduced to only a trace of the composition. Adjustment between the climax plants continues to take place as the decreasers slow down their spread but continue a gradual climb in percent coverage. The increaser species are gradually reduced to their proper percentage in the highly competitive community. Decreasers may not attain as high a percentage of the composition as they occupied before deterioration, due to some species having been eliminated completely.

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CHART 3

GRAZING CAPACITY 1/ OF RANGELAND BY RANGE SITE AND CONDITION CLASS

	: Condition Class
Range site	: Excellent : Good : Fair : Poor
Clay loam	15 - 18 18 - 22 20 - 25 25+
Clay flat	12 - 15 14 - 20 19 - 25 25+
Shallow ridge	17 - 24 24 - 30 28 - 36 32+
Loamy bottomland	8 - 12 10 - 15 14 - 20 20+

^{1/} Expressed in acres required to furnish forage for one animal unit on a year-long basis.

CHART 4

RELATIVE FORAGE QUALITY OF SPECIES 1/

For Cattle

Primary

Pink pappusgrass Whiplash pappusgrass Pinhole bluestem Plains bristlegrass Spike bristlegrass Vine-mesquite Twoflower trichloris Fourflower trichloris Sideoats grama Arizona cotrontop Lovegrass triders Texas wintergrass Texas cupgrass Plains lovegrass Bundleflower Bushsunflower White tridens Alkali sacaton

Secondary

Curlymesquite
Buffalograss
Tobosa
Texas bristlegrass
Fall witchgrass
Slim tridens
Perennial threeawns
Reverchon panicum
Texas tridens
Dropseed spp.
Orange zexmenia
Vine ephedra

Low Value

Red grama
Hairy tridens
Texas grama
Whorled dropseed
Purple threeawn
Halls panicum
Annual forbs
Condalia spp.
Whitebrush
Spiny hackberry
Mesquite
Allthorn goatbush
Cacti Spp.
Desert yaupon

For Sheep

Primary

Bluestem spp.
Sideoats grama
Canada wildrye
Indiangrass
Vine-mesquite
Annual forbs
Plains lovegrass
Hackberry
Texas wintergrass
Greenbriar
Gaura
Engelmanndaisy
Bundleflower
Mexican sagewort
Snoutbean

Secondary

Swittingrass
Tall and meadow
dropseed
Oak spp.
Orange zexmenia
Buffalograss
Curlymesquite
Bumclia spp.

Low Value

Lindhelmer muhly
Ashe juniper
Persimmon
Red grama
Threeawns
Pecan
Texas buckeye
Mesquite
White Crownbeard

^{1/} See description at end of Chart 4.

CHART 4 (CONTINUED)

For Deer

Primary

Mexican sagewort
Oak mast
Mallow spp.
Greenbriar
Hackberry
Guajillo
Texas kidneywood
Range krameria
Skunkbush
Pushsunflower
Jine ephedra
Oundleflower
Lest annual forbs
Guayacan

Secondary

Panicum spp.
Catclaw acacia
Orange zexmenia
Whitebrush
Cacti spp.
Live oak
Texas wintergrass
Texas colubrina
Blackbrush
Sideoats grama

Low Value

Agrito
Ashe juniper
Most other grasses
Texas persimmon
Mesquite
Ceniza
Leatherstem

For Dove and Quail

Primary

Croton

Most annual seeds
Seeds of most grasses
Seeds of most forbs
Tender grass and
forbs (Quail)

Secondary

Dropseed spp.
Hackberry fruit
Cacti fruit (Quail)
Woody plants (fruit)

Low Value

Threeawn seed Hairy triders Most woody plants

^{1/} This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of animals for the various plants. Grazing preference changes from time to time and place to place depending upon the animals, upon plant palatability and nutritive value, stage of growth and season of use, relative abundance, and associated plants. Grazing preference does not necessarily reflect a plant's ecological place in the climax plant community. Detailed data on forage quality of species for specific range sites are found in range site descriptions maintained in local Soil Conservation Service field offices.

1/ Footnote on Chart 4(continued)

The following definitions apply to cattle, sheep, and deer grazing.

<u>Primary</u>: These species generally decrease when the climax plant community is subjected to continuous heavy grazing pressure by the animals listed.

Secondary: These plants usually increase initially, then decrease when the site is subjected to continuous heavy grazing use by the animals listed.

<u>Low Value</u>: These plants continue to increase or invade with heavy continuous grazing use of the site.

Hydrologic cover conditions on the watershed differ from ecological conditions in that they are concerned primarily with the quantity of existing vegetation and litter rather than species composition. Hydrologic cover conditions on rangelands are poor to fair. The majority is in poor condition.

Economic Data

Ranching is the principal agricultural pursuit in the watershed. The major portion of the agricultural land is used for the grazing of cattle, sheep, and wildlife. The majority of the agricultural income results from the sale of mutton, wool, and beef. Minor agricultural revenues in the watershed consist of income from hay, miscellaneous truck crops, and pecans.

There are 44 farms and ranches, wholly or partially within the watershed, averaging 982 acres in size. About 65 percent are smaller than 100 acres. Based on 1969 agricultural census data for Val Verde County, about 75 percent of the farms and ranches in the watershed gross less than \$2,500 annually from agricultural sales. Approximately 50 percent of the farm and ranch operators worked off the farm for 100 days or more in 1969. The estimated current market price of land ranges from \$125 to \$500 per acre, and is dependent primarily on location, accessibility, and productive capability.

It is estimated that less than five percent of the agricultural land in the flood plain is in operating units using one and one-half man-years or more of hired labor.

The labor force within Val Verde County totaled 9,600 in April 1972, the latest period for which statistics are available. During this period, 6.5 percent of the labor force was unemployed. This exceeded the state and national rate of unemployment. Approximately 8.3 percent of the labor force was employed within the agricultural sector. A problem of underemployment also exists. A part of the labor force is employed in seasonal occupations which results in significant underemployment of the total labor resources of the area. The major source of income in the watershed and Val Verde County is from retail and wholesale businesses.

The City of Del Rio, located in the center of the watershed, has a population of 20,921 (1970 census). It is the county seat of Val Verde County and the commercial center for the surrounding farm and ranch area, providing marketing and supply services which are important in the local community.

The watershed is served adequately by U. S. Highways 90, 277, and 377, and Farm Road 2523. There are also numerous county roads which provide access to all parts of the watershed. However, all-weather crossings of San Felipe Creek are limited to U. S. Highways 90 and 277. There are several low water crossings which are frequently impassable.

Fish and Wildlife Resources

The 5.5 mile spring-fed portion of San Felipe Creek is the only significant fish habitat in the watershed. Fish species found in San Felipe Creek and the Rio Grande River at its confluence with San Felipe Creek include large-mouth bass, warmouth, bluegill sunfish, longear sunfish, green sunfish, yellowbelly sunfish, redear sunfish, green-redear hybrid sunfish, Rio Grande perch, freshwater drum, white bass, alligator gar, spotted gar, longnose gar, shortnose gar, flathead catfish, yellow bullhead catfish, black bullhead catfish, channel catfish, blue catfish, carp, and buffalo. Numerous species of minnows including the Rio Grande Darter and Devil's River minnow may be found in San Felipe Creek.

About three miles of the perennial portion of San Felipe Creek flows through the City of Del Rio and provides the only significant public fishing in the watershed. The remaining 2.5 miles downstream from Del Rio flows through private lands and public access is limited. The perennial portion of the stream provides approximately 400 man-days of fishing per year. There is no commercial fishing in the watershed, and none is expected to develop in the future.

Game animals occur in low to moderate numbers in the watershed. Species include white-tailed deer, javelina, wild turkey, mourning dove, white-wing dove, and scaled quail. Mourning doves, the most abundant species, receive heavy hunting. Deer are moderately abundant in the Edwards Plateau portion of the area but receive light hunting. Big-game hunting is on a lease basis throughout the area. Future wildlife populations are not expected to significantly increase due to limited food and cover conditions.

Mammals which occur in Val Verde County and the watershed area include opossum, little short-tailed shrew, lappet-chinned bat, yuma bat, cave bat, Georgia bat, western canyon bat, red bat, lump-nosed bat, pallid cave bat, guano bat, mastiff bat, raccoon, ringtail, long-tailed weasel, spotted skunk, striped skunk, hog-nosed skunk, badger, gray fox, coyote, mountain lion, bobcat, black-tailed jackrabbit, eastern cottontail, Audobon cottontail, armadillo, nutria, Mexican ground squirrel, spotted ground squirrel, rock squirrel, Texas antelope ground squirrel, fox squirrel, and numerous species of rats and mice. Evidence of jaguar, ocelot, margay, and jaguarundi is occasionally found in the watershed.

Reptiles and amphibians of the area include: tiger salamander, Texas salamander, Couch's spadefoot toad, western spadefoot toad, barking frog. Texas cliff frog, cricket frog, green toad, red-spotted toad, Texas toad, gulf coast toad, bullfrog, leopard frog, green plains narrow-mouthed toad, yellow mud turtle, river cooter, pond slider, western box turtle, Texas tortoise, spiny softshell, Texas banded gecko, greater earless lizard, collared lizard, spot-tailed earless lizard, lesser earless lizard, roundtailed horned lizard, Texas horned lizard, canyon lizard, Texas spiny lizard, crevice spiny lizard, eastern fence lizard, side-blotched lizard, tree lizard, short-lined skink, great plains skink, ground skink, Texas spotted whiptail, little striped whiptail, checkered whiptail, Texas alligator lizard, Texas blind snake, western blind snake, glossy snake, ringneck snake, indigo snake, corn snake, common rat snake, trans-pecos rat snake, western hook-nosed snake, western hognose snake, night snake, common kingsnake, gray-banded kingsnake, milk snake, coachwhip, striped whipsnake, plain-bellied water snake, diamond-backed water snake, rough green snake, bullsnake, longnosed snake, mountain patch-nosed snake, great plains ground snake, Mexican black-headed snake, flat-headed snake, plains black-headed snake, red blackheaded snake, black-necked garter snake, checkered garter snake, western ribbon snake, coral snake, copperhead, western diamonback rattlesnake, rock rattlesnake and black-tailed rattlesnake.

Birds of the watershed area include: red-tailed hawk, red-shouldered hawk, turkey vulture, scissor-tailed flycatcher, cliff swallow, barn swallow, robin, mockingbird, boat-tailed grackle, cowbird, house sparrow, common raven, vermillion flycatcher, least tern, great blue heron, scaled quail, roadrunner, common nighthawk, common crow, rock wren, Bullock's oriole, horned grebe, pied-billed grebe, green heron, American egret, snowy egret, cattle egret, mallard, gadwall, pintail, green-winged teal, canvasback, American merganser, black vulture, golden eagle, harrier (marsh hawk), osprey, American coot, killdeer, American avocet, ground dove, great horned owl, lesser nighthawk, belted kingfisher, green kingfisher, yellow-shafted flicker, red-shafted flicker, yellow-bellied sapsucker, bank swallow, cave swallow, purple martin, canon wren, cedar waxwing, phainopepla, logger shrike, meadowlark (W.), yellow-headed blackbird, red-winged blackbird, hooded oriole, scarlet tanager, cardinal, pyrrhuloxia, blue grosbeak, painted bunting, purple finch, lark bunting, gray-headed junco, yellowbreasted chat, and long-billed curlew. -

The watershed is within the range of the bald eagle, American peregrine falcon, ocelot, jaguarundi, margay, mountain lion, and jaguar, which are considered threatened species. These species may occasionally occur in the watershed but are not known to be residents. The Rio Grande Darter is listed as a peripheral threatened species by the Fish and Wildlife Service and may occur in San Felipe Springs and San Felipe Creek. The Devil's River minnow is also reported to occur within the watershed.

^{1/} Fish, mammal, reptile, amphibian, and bird lists were complied by Jake Dameron, National Park Naturalist, National Park Service, Del Rio, Texas for the Amistad Lake area and were obtained from Dr. Glenn Longley, Southwest Texas State University, San Marcos, Texas.

No rare or endangered plant species were observed in the vicinity of the proposed site during the planning period. The texas pistache (Pistacia texana) is known to occur in Val Verde County but was not identified in the watershed.

Recreational Resources

In addition to fishing, Amistad Reservoir, which is located on the Rio Grande River about 10 miles northwest of Del Rio, provides an abundance of year-round opportunities for water-based recreation.

Archeological and Historical Values

The Texas State Historical Commission has recognized a number of locations in the watershed and Val Verde County as having historical significance. Included in these points of interest are the site of Camp Hudson, the Old Perry Building, and San Felipe Springs within the City of Del Rio. The National Register of Historic Places also lists historic locations and archeologic sites in Val Verde County. Those listed are not within San Felipe Creek Watershed.

Under contract with the National Park Service, U. S. Department of the Interior, an intensive archeological survey of the floodwater retarding structure site was conducted by the Texas Archeological Survey, University of Texas at Austin, under the direction of Mr. David S. Dibble as principal investigator.

This survey yielded evidence of 13 archeological sites. The debris encountered consists of discrete areas of aboriginal fire hearths, fire hearth remnants and incipient midden accumulations, and shallow midden accumulations with no other discernible discrete features. Chipped stone artifacts and debris were associated with all of the sites recorded during the survey.

These resources are distributed along both sides of the mainstem creek as well as the major left bank tributary that is located within the project area. The sites are situated on two discrete geological zones. One group of sites is situated on the colluvial slopes of the eroded low bluffs along the lateral margins of the stream valley and which are well above the present flood plain. The other group of sites is situated on the alluvial terraces that are just above the modern flood plain.

The fire hearths are generally circular clusters of fire-cracked rock and range from 0.5 meter diameter to 1.5 meters in diameter, but cluster at slightly over 1 meter in diameter. They are generally flat to slightly mounded; none were observed to be basin-shaped. The degree of fracturing within the individual stones varies somewhat, and probably reflects intensity of use. Some of the hearths are only slightly exposed and are apparently intact at the present time. Others are completely exposed and are deflated and scattered by erosion. Minor subsurface probes during the survey indicate that charcoal is preserved in some (three of four tested) of the hearths.

Incipient midden accumulations consist of thin concentrations of burned rocks. Where not deflated or otherwise severely eroded, these rocks are contained within a matrix of loose gray ashy soil. In areas of severe erosion, incipient midden accumulations appear as a discrete cluster of burned rocks lying on the ground surfaces. These accumulations very considerably in size, but are consistently composed of only one visible layer of stones. Occasionally intact fire hearths are discernible within the confines of incipient midden accumulations.

The shallow midden accumulations are more concentrated versions of the incipient midden accumulations. They consist of masses of burned rocks and loose gray ashy soil, and vary considerably in size and thickness. Subsurface probes indicate that the middens are up to at least 40 cm. thick. No discrete fire hearths were noted within the midden accumulations, but they may be present. Scattered flecks of charcoal were noted in the deposits exposed by subsurface probes.

The recorded number and description of each of the 13 sites surveyed are as follows:

Site No. 41 VV 431

Scattered incipient midden accumulations with occasional intact fire hearths in alluvial terrace; apparent midden area noted via binoculars on Country Club property. Appears to have been chained for mesquite on both sides of the fence.

Site No. 41 VV 432

Distinct midden area on downstream end of site (about 300 meters long); rest of site consists of incipient midden and numerous hearths in extensive alluvial terrace. Area south of access road (including the midden area) has been disrupted by mesquite chaining; area north of road apparently not chained. Margins adjacent to creek currently undergoing severe erosion.

Site No. 41 VV 433

Scattered fire hearths in colluvial terrace; upstream and consists of deflated incipient midden resting on an eroded bench of the low bluff. Portions of site undergoing erosion on margin; no apparent evidence of mesquite chaining.

Site No. 41 VV 434

Site consists of scattered fire hearths and possibly some incipient midden debris distributed over the low hill. Surface is generally deflated with a thin soil mantle; some intact deposits and features remain. No evidence of mesquite chaining was noted.

Site No. 41 VV 435

Extensive area of scattered fire hearths over flanks of hill; possible incipient midden accumulations in some areas; midden deposit on lower portion of site (near creek). Some areas (particularly margins) severely eroded and deflated; other areas on flank and at foot retain relatively thick soil mantle. No evidence of mesquite chaining noted.

Site No. 41 VV 436

Scattered hearths and incipient midden accumulation in alluvial-colluvial terrace. Eroded on margin near creek and along edge of lateral gully that runs through the upstream end of the site. Some erosion caused by road traversing the length of the site; also some disturbance from cattle feeder located on the site. No evidence of mesquite chaining noted. Small gushing spring at upstream end of site.

Site No. 41 VV 437

Extensive lunate-shaped site situated on alluvial-colluvial terrace. Upstream end consists of thin midden deposits; central portion of site consists of incipient midden accumulation with occasional distinct hearths; downstream end mostly an area of scattered intact fire hearths. Severely eroded and deflated around interior margin of site. No evidence of mesquite chaining noted.

Site No. 41 VV 438

Site consists of several distinct hearths scattered over the top of the bluffs. Some scattered burned rock noted; may possibly have some incipient midden accumulation. Very thinly scattered site. Slight deflation of surface; no severe erosion, nor any evidence of mesquite chaining.

Site No. 41 VV 439

Downstream end of site consists of thinly scattered incipient midden in a colluvial matrix. Upstream end consists of a very few hearths eroding from the thin soil mantle covering that portion of the site. No evidence of mesquite chaining was noted. Severe erosion along margin of upstream end of site.

Site No. 41 VV 440

Very extensive and varied site. Northeast corner marked by distinct midden accumulation; rest of north end consists of incipient midden accumulation. South half of site consists of scattered discrete hearths; east side consists of numerous hearths and incipient midden accumulation. Most of site appears to be intact; margins along the two creeks are eroded, severely so along the tributary. No obvious evidence of mesquite chaining noted.

Site No. 41 VV 441

Thinly scattered site consisting of an incipient midden accumulation at each end and a few scattered discrete hearths. Bisected and partially scattered by a dirt road; margins by each creek heavily eroded.

Site No. 41 VV 442

Downstream end consists of widely scattered discrete hearths; central portion contains an incipient midden accumulation. The upstream half consists of several distinct hearths and a small midden accumulation. Edge adjacent to creek heavily eroded; upstream end has been damaged by mesquite chaining.

Site No. 41 VV 443

Extensive terrace site with widely scattered hearths and a small midden accumulation on the downstream end; incipient midden accumulation and numerous fire hearths on the upstream portion. Moderate to severe erosion along the margins near the creek; apparently the entire site has been chained to control mesquite, effectively disrupting some areas severely. Appears to retain extensive areas of intact deposits.

An unpublished report, "AN ARCHEOLOGICAL SURVEY OF AREAS TO BE AFFECTED BY THE SAN FELIPE CREEK WATERSHED PROJECT, VAL VERDE COUNTY, TEXAS: A PRELIMINARY STATEMENT OF RESULTS", Texas Archeological Survey, The University of Texas at Austin, Texas, October 1973, contains additional details relative to the archeological sites surveyed. This report is available for review by qualified persons at the State Office, Soil Conservation Service, First National Bank Building, Temple, Texas 76501.

Soil, Water, and Plant Management Status

The Devils River Soil and Water Conservation District was organized as a subdivision of State Government with responsibility in the field of soil and water conservation in Val Verde County. The District is dedicated to the conservation of soil, water, plant, wildlife and related resources. It is governed by a locally-elected board of directors. Technical assistance to the District is provided by the Soil Conservation Service through an existing memorandum of understanding with the United States Department of Agriculture. The District establishes policies and sets priorities for conservation of resources within the district. Soil and water conservation districts constitute a significant level of citizen control in decision making. 1

The District does not have regulatory authority and operates a cooperative voluntary program of assistance to land users within the district.

Irland, Lloyd D., and Ross J. Vincent. "Citizen Participation in Decision Making--A Challenge for Public Land Managers", Journal of Range Management, 27 (3) 182-185.

Land users who elect to cooperate with the District in the application of a conservation program for land they own or control are provided technical assistance in the planning and application of conservation measures. Most land treatment decisions are based on a resource conservation plan developed by the land user in consultation with technical personnel assisting the District. Conservation plans are documents which contain material relative to the use and treatment of soil, water, plant, wildlife, and related resources of an entire individual land unit. Conservation plans contain soil, water, plant, and other needed inventories; data on critical conservation problems; and a record of decisions which land users have made to reach conservation objectives. The length of time required to fully implement a plan is contingent upon many factors, including available labor, capital, materials, and time.

Conservation plans are developed which accomplish the objectives of the land user and result in conservation of basic resources. A careful evaluation of alternatives often reveals conflicts in the selection of planned land treatment measures. As an example, the conversion of rangeland to pastureland may increase the economic return from livestock and reduce its value to wildlife. The ultimate decision of land use and treatment rests with the land user so long as it is consistent with sound resource management.

About 31 land users in the watershed are cooperating with the District. conservation plans have been developed for 29 farm and ranch units covering about 71 percent of the watershed.

There is no land in the watershed which is being used for a purpose to which it is not suited because of edaphic or other limitations. Needed land treatment measures have been applied to date by landowners and operators at an estimated expenditure of \$54,100.

Projects of Other Agencies

There are no existing or proposed water resource development projects of any other agencies within the watershed.

The works of improvement included in this plan will have no known detrimental effects on any existing or proposed downstream works of improvement of other agencies.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land Management

The principal land problem in the watershed is within the drainage area of Calaveras Creek tributary. Due to the lack of top soil, low rainfall, and pronounced relief of hills and deep gullies, this area is now lying idle and subject to erosion with little chance for improvement under existing conditions.

Floodwater Damage

An estimated 783 acres of the watershed, excluding stream channels, is flood plain. This is the area that would be inundated by a 100-year frequency flood.

Present flood plain land use is as follows: rangeland, 46 percent; pastureland and hayland, 19 percent; and miscellaneous uses including urban areas, public roads, and railroads, 35 percent. Current trends are toward improvement of native rangeland.

Some land users, on an individual basis, have attempted to enlarge, straighten, and clean out San Felipe Creek. This has resulted in very little reduction of flood damage. The City of Del Rio and the Val Verde County Commissioners Court have attempted to reduce damages resulting from flooding from San Felipe Creek by clearing segments of the channel within the city. This has materially reduced the damages caused by small floods of frequent occurrence, but has had little effect on larger floods.

Flooding occurs frequently in portions of the watershed causing damages to agricultural and nonagricultural properties. Major floods, inundating more than half the flood plain, occur on the average of once every seven to eight years. Minor floods, inundating less than half the flood plain, occur on the average of about once a year. Cumulative totals of recurrent flooding show an average of 260 acres flooded annually during the evaluation period.

The most disastrous flood in recent years occurred on September 23-24, 1964. $\frac{1}{2}$ The rain actually began on September 19, with almost nine inches of rainfall recorded by midnight September 21, causing San Felipe Creek to leave its banks and force evacuation of low lying areas. On September 23, the rain began to fall again and by the morning of September 24, a total of 4.39 inches of rain had fallen in Del Rio, with over two inches occurring in a three-hour period. The recurrence interval of the resulting flood peak was estimated to be about 13 years. The resulting flood inundated approximately 610 acres of flood plain in the watershed, of which 200 acres are located inside the urban area of Del Rio along San Felipe Creek, Currents of rushing water caused evacuation of over 500 persons from their homes. Over 130 homes and 20 businesses were flooded to depths ranging from floor level to over 7.5 feet. Numerous low water crossings were closed, sewer and water lines broken, and streets washed out. Many of the refugees from the flood were housed in the San Felipe High School. The Red Cross established headquarters in Del Rio and provided food, medical care, and other necessities for flood victims. Numerous individuals and volunteer organizations pitched in to help victims clean up and reorganize their flood-ravaged businesses and homes. Under the present level of development, the direct monetary floodwater damage from such a flood is estimated to be \$276,200, of which \$272,000 would be to urban properties.

^{1/} U. S. Department of Commerce, Weather Bureau, Climatological Data-Texas, Vol. 69, No. 9: Sept. 1964

Other large floods that caused severe floodwater damages occurred in 1957, 1952, 1948, 1944, and 1935.

Under the present level of development, it is estimated that approximately 365 homes and 35 businesses would be damaged from a 100-year frequency flood event. A flood of this magnitude would result in flood depths approximately 2.3 feet higher than those experienced in 1964. The estimated direct floodwater damages to existing urban properties that would result from such a flood are estimated at \$846,240 at the present level of development.

Minor urban damages to yards, street crossings, and miscellaneous properties start at a peak discharge which can be expected to occur on an average of twice a year.

For the floods evaluated, which includes floods up to and including the 100-year frequency, the total projected direct floodwater damage discounted to present worth is estimated to average \$151,410 annually at adjusted normalized prices. Of this amount, \$810 is crop and pasture damage, \$940 is other agricultural damage, \$140 is road and bridge damage outside the urban area, and \$149,520 is damage to urban properties. Of the damage to urban properties, \$124,140 is to residential properties, \$11,320 is to business properties, and \$14,060 is to streets, utilities, etc. Indirect damages such as interruption of travel, losses sustained by businesses, evacuation of premises when floods threaten, and similar losses are estimated to average \$30,190 annually.

Erosion Damage

The estimated average annual rate of gross erosion is 4.7 tons per acre. Of this, sheet erosion accounts for 88 percent, gully erosion 7 percent, streambank erosion 2 percent, and flood plain scour 3 percent. The great majority of the gully erosion and nearly half the sheet erosion is occurring as geologic erosion of the Grayson Marl in the drainage area of Calaveras Creek. Erosion rates for the remainder of the watershed are low, primarily because the soils on steeper slopes are either stony or gravelly and are used as rangeland.

An estimated 66 acres are damaged by flood plain scour. Damage to flood plain lands from flood plain erosion has resulted in reductions in crop yields. The damaged areas range from 1.0 to 7.0 feet in depth and from 80 to 500 feet in width. It is estimated that scour causes a 10 percent loss of productive capacity on 18 acres, 20 percent on 30 acres, and 30 percent on 18 acres. The average annual value of this damage is estimated to be \$1,010 adjusted normalized price levels.

Sediment Damage

The estimated average annual sediment production rate is 0.49 acre-feet per square mile. This amounts to an average annual sediment yield of 23 acre-feet at the lower limit of the watershed. The estimated suspended

sediment concentration in one inch of average annual storm runoff at the lower end of the watershed is 8,000 milligrams per liter. When the flow from San Felipe Springs is included, the suspended sediment concentration is estimated to be 330 milligrams per liter. No estimates of monetary damages for either of these concentrations have been made.

Low inherent erosion rates of most of the watershed soils and the fine texture of sediment are primarily responsible for a low rate of sediment damage on the flood plain. Damages from deposition of thin overbank deposits of calcareous silt and clay are very minor.

Problems Relating to Water Management

An adequate supply of good quality water from San Felipe Springs for future uses is available to the City of Del Rio and Laughlin Air Force Base. However, limestone ground water reservoirs, such as the one from which San Felipe Springs issue, are highly susceptible to contamination. Expected urban and industrial expansion in the watershed area will result in increased potential sources of pollution. It is anticipated that Del Rio's population will increase from the present 20,921 to 33,500 by 1989. Extreme caution and careful watershed management will be necessary to maintain the good quality of water at San Felipe Springs. Livestock and wildlife watering needs are met primarily by well water since surface ponds generally have poor water-holding characteristics.

In this semi-arid region, the presence or lack of water is a controlling factor on fish and wildlife populations. The 5.5 mile segment of San Felipe Creek having perennial flow is the only significant fish habitat in the watershed. This portion of the creek is one of the few dependable drinking water sources for wildlife. Wildlife species including deer, quail, turkey, and non-game birds would benefit from installation of dependable sources of drinking water in the watershed. Food and cover for wildlife are also limited.

Economic and Social Problems

Most of the area subject to flooding in Del Rio is populated by residents with below average incomes. A significant portion of the wage earners residing in the area suffer from underemployment. These residents are less able to sustain flood losses without materially reducing their standard of living. The adverse economic and physical effect of flooding has been felt throughout the entire watershed and will prompt local participation in the alleviation of the flood problem.

ENVIRONMENTAL IMPACT

Flood Prevention, Erosion, and Sediment

The installation of conservation land treatment measures and the floodwater retarding structure will achieve the project objectives of watershed protection and flood prevention.

The installation of conservation land treatment measures on 2,520 acres of land, in addition to effectively maintaining those already applied, will protect soil, water, and related resources by preventing soil erosion, reducing water pollution by sediment, conserving irrigation water, and reducing runoff.

Application of conservation measures on rangeland will increase the quality and quantity of vegetation and reduce the loss of soils and plant resources due to erosion and excessive grazing use.

The installation of land treatment practices such as conservation cropping system, crop residue management, and pastureland and hayland management on irrigated cropland and pastureland and hayland will help protect the soil from erosion and will assist in sustaining the productivity of the soil. The proper management of irrigation with better distribution facilities and methods of application will reduce the waste of water.

After the project is complete, the level of accomplishment for needed land treatment is expected to reach at least 88 percent, an 8 percent increase over present conditions.

The installation of all project measures, which includes conservation land treatment and the floodwater retarding structure, will provide flood protection to 783 acres of agricultural and urban flood plain land. Reduction in area inundated varies with respect to location within the watershed. The total average annual area flooded will be decreased from 257 acres to 23 acres, a 91 percent reduction. The average annual area flooded in the urban area of Del Rio will be reduced from 84 acres to 4 acres, or 95 percent; average annual area flooded above Del Rio will be reduced from 18 acres to 1 acre, or 94 percent; and the average annual area flooded below Del Rio will be reduced from 155 acres to 18 acres, or 88 percent. The general areas that will experience reduced flooding after the complete project is installed are presented in the following tabulation:

Average Annual Area Inundated												
Evaluation : : : :												
Reach	* *	Without	: With :									
(Appendix	C): Location :	Project	: Project :	Reduction								
		(acres)	(acres)	(percent)								
1	San Felipe Creek below City of Del Rio	155	18	88								
2	San Felipe Creek-Urban	0.4	,	0.5								
	Area-City of Del Ric	84	4	95								
3	San Felipe Creek above City of Del Rio	18	1	94								
	Total	257	23	91								

The number of acres inundated in each reach without and with the project by various frequency floods is presented in the following tabulation:

Area Inundated by Selected Recurrence Intervals											
Average Recurrence Interval											
Evaluation : 2-Year :		5-Year :		25-Year :		100-Year					
Reach	:Without:	: With :	Without	: With :	Without	: With :	Without	With			
(Appendix C)	:Project:	Project:	Project	:Project:	Project	:Project:	Project:	Project			
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)			
1	71	0	118	50	366	74	440	109			
2	36	0	72	0	242	24	265	31			
3	13	0	21	0	65	0	78	0			
			1010								
Total	120	0	211	50	673	98	783	140			

The sponsors are aware that the project will not provide complete flood-free protection to all urban properties. The City of Del Rio will notify property owners in Del Rio of the flood hazards that still will remain after project installation and will discourage further construction in the areas still subject to flooding. The City of Del Rio will publicize, at least once annually, the nature and extent of the hazards remaining in those areas still subject to flooding by the 100-year event.

Application of the planned land treatment program is expected to decrease annual gross erosion from about 142,000 tons to 135,000 tons, a reduction of 5 percent. Annual flood plain scour damage on 66 acres is expected to be reduced about 79 percent. The average annual sediment yield from the watershed will be reduced from an estimated 23 acre-feet to 16 acre-feet as a result of the combined program of land treatment and floodwater retarding structure. The estimated concentration of suspended sediment leaving the watershed in annual surface runoff (excluding flow from San Felipe Springs) will be reduced from 8,000 to 5,600 milligrams per liter as a result of application of the planned land treatment and the construction of the floodwater retarding structure. With flow from San Felipe Springs included, suspended sediment concentrations in average annual stream flow at the mouth of the watershed will be reduced from 330 milligrams per liter to 230 milligrams per liter.

During construction of the floodwater retarding structure, air and water pollution will increase slightly from dust and sediment inherent to the construction process. This increase will be kept within tolerable limits. After installation and with the establishment of vegetation, pollution from these sources is expected to be at or below preconstruction levels.

The construction of the floodwater retarding structure will not have a significant visual impact on the area. The rock blanket of native limestone and denuded limestone bedrock will blend with the natural rock outcrops and shallow stony soils.

The effects of the works of improvement on mineral resources have been considered. The sponsors recognize the importance of limestone, gravel, clay, petroleum, natural gas, and natural gas liquids in the watershed and vicinity. The project will not adversely affect or be adversely affected by the extraction of mineral resources, assuming precautionary measures are taken.

Economic and Social

Owners, residents, and operators of 15 farms and ranches in the flood plain and 365 residential and 35 business units in Del Rio will be affected directly by a reduction of floodwater and associated damages. Floodwater damages will be reduced at least 99.5 percent from all flood events up to and including the one percent chance (100-year) event.

The protection of the agricultural flood plain from frequent flooding will insure more dependable crop yields and help to stabilize the agricultural sector of the local economy. This will improve farm income and help make it possible for farmers and ranchers of the area to stay in business and not migrate to the city.

The project will create additional employment opportunities for local residents. The firms contracting for installation of the structure will employ some of their employees locally. The expenditure of funds for construction of the floodwater retarding structure will create approximately 20 man-years of employment in the local area. The operation and maintenance of the project measure over the life of the project will also provide employment opportunities for the local residents.

This project will provide flood-free protection from a 100-year frequency event to all existing urban properties except a portion of the Community Center building, several low water crossings, and yards of houses located along the channel of San Felipe Creek. The depth in the area subject to continued flooding from the 100-year frequency flood is a maximum of 2.3 feet with an average depth of approximately 1.0 foot. With the project installed, damages to urban properties will be reduced from \$846,400 to \$4,000. The actions of people during times of floods, whether major or minor, cannot be predicted. However, with any reasonable precautions, the hazard to life from floodwaters will be eliminated. The disruption and relocation of residents during periods of flood threats will be virtually eliminated along with costs necessary for evacuation and emergency shelter and relief operations. Property owners in Del Rio can improve and upgrade their homes without fear of incurring increased damages to their improvements

from periodic flooding. Without widespread flooding, funds that would usually be used for repairing and renovation of flood-damaged property can be utilized to improve public park and recreational areas. Projects by local civic organizations to beautify and develop the aesthetic values of areas now subject to flooding will become feasible. Public health and sanitary conditions will also be improved by reduced or eliminated flooding.

These conditions include reduced hazards to loss of life and injury, elimination of health hazards associated with damage to water supply and waste disposal systems, and improved vector control.

The relocation of two families will have no social, cultural, or economic impact on those involved inasmuch as they will be living in the same houses they now occupy with only a slight change in location upon the same property. These families will undergo the temporary inconvenience of moving household goods and belongings.

A summary of economic findings is attached as Appendix A.

Fish and Wildlife

Fish and wildlife habitat will be modified to some extent by installation of the project. Fish habitat will be improved by reducing the sediment entering the perennial portion of San Felipe Creek and the Rio Grande. Application of land treatment measures will generally benefit wildlife in the watershed. Brush management applied with wildlife considerations will have beneficial effects for wildlife by providing more "edge" type habitat, reducing browse species to heights usable by game animals, and providing more forbs and succulent grasses in open areas. It will also be much easier for hunters to harvest an adequate number of animals to control populations when necessary. Hunter success, hunter safety, and lease income are generally increased as a result of proper brush management.

Various methods of brush management will have different effects on different species. Dozing and stacking brush will result in the disturbance of ground cover and an increase in annual weed production. Initially, it will also create brush piles. This method of management will be advantageous for many small mammals, quail, and other seed-eating birds. If proper grazing management is carried out following control, an increase in grass cover will occur. This will provide better quail nesting habitat, but will result in less annual weeds. Grass seeds are an important food source for turkeys and will increase following brush control and proper management. Brush management will not generally be advantageous to javelina.

Most rangeland operators carry out a continuous program of brush management on ranches whereby portions of pastures are controlled each year. Most ranch units do not have sufficient capital to apply all brush management in one operation. As a result, there are usually areas in each pasture which are freshly treated, in various stages of woody plant reinfestation, and areas which are densely covered with woody plants. This rotational effect will assure a continuous availability of annual weeds, grasses, browse plants, and cover needed by a variety of wildlife.

Other range management practices such as deferred grazing, proper grazing use, and planned grazing systems increase the variety, quality, and quantity of vegetation. Overuse of desirable browse, forb, and grass species is largely eliminated. These practices are generally beneficial to most wildlife species.

Conservation cropping systems, crop residue use, and plantings of winter cover crops such as oats will provide an increased variety of food and more cover for most species of wildlife.

The floodwater retarding structure is not expected to provide a permanent pool of water; however, water will be temporarily impounded or retarded which will increase slightly the amount of water available to wildlife. Reduction of flooding below the floodwater retarding structure will decrease the nest loss of ground-nesting birds.

The project is not expected to have a significant impact on any threatened species which occurs in the watershed. Precautions will be taken to minimize any translocation of sediment or debris during the construction process which might adversely affect downstream fish habitat. Only approved herbicides and methods of use will be used to avoid adverse effects to downstream resources.

Other

A total of 488 acres of rangeland will be required for the construction and proper functioning of the floodwater retarding structure. The dam and emergency spillways will require 40 surface acres and the sediment pool 160 acres. Vegetation will be cleared from 92 acres. Clearing in the sediment pool will be limited to 52 acres or that area below the lowest ungated outlet elevation. Existing vegetation will be disturbed as little as possible. The retarding pool will require an additional 288 acres. The vegetation on this 288 acre area will be left intact. Approximately 2.1 miles of intermittent stream channel will be periodically inundated. No significant lasting effects are anticipated from this inundation. With the implementation of measures and precautions to protect the environment discussed in the PLANNED PROJECT section, no significant impacts are expected on water quality in runoff on San Felipe Springs.

Utility lines, private roads, fences, and two houses will require a change in location or modification. Several private roads below the planned floodwater retarding structure will periodically be impassable because of release flows. The road crossings will be improved to allow their use during release flow, or alternate routes will be provided during periods of inundation.

The County Commissioners Court of Val Verde County in cooperation with the Texas Health Department is in the process of designating the watershed above the floodwater retarding structure as a pollution control area. This action will protect the quality of the water supply for the City of Del Rio and Laughlin Air Force Base, and endeavor to develop a general awareness of potential pollution from urban and industrial encroachment. With the acquisition of easements on 488 acres necessary for the construction and functioning of the floodwater retarding structure, the land use will be limited. This limitation will not allow urban and industrial encroachment on the area which would interfere with the functioning and maintenance of the floodwater retarding structure. If pesticides should be considered for use on rangeland in the drainage area above the floodwater retarding structure, land users will be provided assistance in selecting and applying compounds in compliance with Soil Conservation Service Environment Memorandum-3 and Plant Sciences Memorandum-8. During and after project installation, vigilant action in strict compliance with this memorandum will insure that the present high quality of water from San Felipe Springs and from watershed runoff above the springs will not be lowered with the use of pesticides.

The immediate direct effects of construction and clearing operations on the archeological resources, as appraised by the Texas Archeological Survey, are as follows:

Site No. Effects

- 41 VV 431 Should not be affected by construction activities. Will benefit by control of overbank flooding. May suffer some erosion if emergency spillway is used, but damage should not be significant.
- 41 VV 432 Lower 1/3 of site should not be affected by construction; should benefit from control of overbank flooding. Upstream 2/3 traversed by access road that will probably be used during construction; widening and leveling of existing road and temporary increase of vehicular traffic will affect this portion detrimentally. Extreme upper end may be removed or disturbed by construction activities and/or parking of vehicles.
- 41 VV 433 Margin of site adjacent to creek will probably be disturbed by brush clearing operations in the sediment pool below the lowest ungated outlet elevation. Downstream end will most likely be disturbed by construction of the west emergency spillway.

- 41 VV 434 Should not be affected by construction or clearing operations.
- 41 VV 435 Edge of site adjacent to creek will be disrupted by clearing operations.
- 41 VV 436 Should not be affected by construction or clearing operations.
- 41 VV 437 Should not be affected by construction or clearing operations.
- 41 VV 438 Should not be affected by construction or clearing operations.
- 41 VV 439 Should not be affected by construction or clearing operations.
- 41 VV 440 Margins of site will be disrupted by clearing operations; interior areas of site may be subject to occasional vehicular traffic which would disrupt the relatively thin deposits.

 Downstream end may be removed for fill material.
- 41 VV 441 Will be largely destroyed by dam construction.
- 41 VV 442 Margin of site adjacent to creek will be disrupted by clearing operations. Downstream end may be subjected to heavy vehicular traffic, particularly during construction of the east emergency spillway.
- 41 VV 443 May be subjected to occasional vehicular traffic during clearing operations; will disrupt the thin deposits particularly on the downstream end.

Indirect effects the project may have on the archeological resources after the completion of construction and clearing activities are difficult to assess. The following potential indirect effects have been recognized by the Texas Archeological Survey, but cannot be assessed fully.

- 1. Erosional cutbanks could develop around the sediment pool and result in slow but destructive erosion on portions of the archeological sites involved if the sediment pool were to hold water and the water level were to remain relatively constant.
- 2. Frequent or occasional short-term inundation of areas above the sediment pool may or may not be heneficial.
- 3. Brush control and soil stirring that may be done by individual private landowners would disrupt archeological sites, if present.
- AN ARCHEOLOGICAL SURVEY OF AREAS TO BE AFFECTED BY THE SAN FELIPE CREEK WATERSHED PROJECT, VAL VERDE COUNTY, TEXAS: A PRELIMINARY STATEMENT OF RESULTS, unpublished report, Texas Archeological Survey, University of Texas at Austin, Texas, October 1973

- 4. Sites around the sediment pool could be subjected to further disruption if livestock lanes were constructed thereby concentrating cattle trails that could eventually remove substantial archeological deposits.
- 5. Public use of any water that might be impounded would be potentially dangerous to archeological resources.

FAVORABLE ENVIRONMENTAL EFFECTS

- 1. With the application of the planned land treatment, the level of accomplishment for needed conservation measures and practices is expected to reach 88 percent.
- 2. With the application of improved irrigation facilities, more efficient use of water can be realized.
- 3. Erosion and sediment will be reduced by application of land treatment measures.
- 4. Total average annual acres flooded will be reduced 91 percent.
- 5. Average annual acres flooded in Del Rio will be reduced 95 percent.
- 6. Floodwater damages will be reduced by at least 99.5 percent from all flood events up to and including the 100-year frequency event.
- 7. Flood protection in flood-prone agricultural areas will insure more dependable crop yields and help stabilize the agricultural sector of the local economy.
- 8. Property owners will be provided the opportunity to improve their homes without fear of increased flood damages.
- 9. The City of Del Rio will have the opportunity to improve and intensify public recreational facilities in its public park area without concern to flood damages thus improving civic pride and human environment.
- 10. Projects by local civic organizations concerned with beautifying and preserving aesthetic values in the flood plain will become feasible.
- 11. Public health and sanitation facilities and conditions will improve in the presently flood-prone areas of Del Rio.
- 12. The installed project will provide local government incentive to restrict and control potential sources of pollution in the area of the watershed above the floodwater retarding structure.

- 13. Approximately 20 man-years of employment will be required for installation of the floodwater retarding structure. Operation and maintenance of the structure will provide opportunities for employment.
- 14. Better fish and wildlife habitat will be provided by:
 - a. Improving water quality in San Felipe Creek and the Rio Grande River for fish production;
 - b. Supplying more food for upland game animals with land treatment measures such as conservation cropping systems, deferred and proper grazing, and brush control with wildlife considerations;
 - c. Furnishing temporary water for wildlife in the sediment pool of the floodwater retarding structure and permanent water in tanks and troughs; and
 - d. Improving flood plain conditions for ground-nesting birds.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

- 1. Air and water pollution from dust and sediment will increase during construction of the floodwater retarding structure.
- 2. Utility lines, private roads, fences, and two houses will require changes in location or modifications.
- 3. The contents of a barn, and two houses and their contents and occupants (two families), must be relocated.
- 4. Approximately 40 acres of rangeland vegetation and wildlife habitat will be destroyed by construction of the emergency spillways in rock and riprapping the dam with a rock blanket.
- 5. Approximately 52 acres of rangeland vegetation and wildlife habitat will be altered by clearing woody vegetation and borrowing operations.
- 6. Indiscriminate brush control could be damaging to wildlife habitat in the watershed by removing needed protective cover.
- 7. An increase in the density of grass cover at the expense of seed bearing forbs and weeds will decrease the amount of food for quail and dove.

- 8. Unsalvaged archeological resources located in the area required for construction and proper functioning of the floodwater retarding structure will be subject to disturbance or destruction during construction and periodic inundation after installation of the structure.
- 9. Public access to the floodwater retarding structure site would be potentially dangerous to archeological resources.
- 10. Concentration of livestock movement and land treatment requiring the movement or disturbance of soil would disrupt archeological sites, if present.

ALTERNATIVES

The considered alternatives to the propose project action were: (1) An accelerated program of applying land treatment measures for watershed protection; (2) land treatment, restrictions on construction in the flood hazard area, and flood insurance; (3) purchase of urban flood plain areas with relocation of homes, businesses, and improvements, and changing the present use of agricultural land to one that is less susceptible to damage by flooding; (4) floodproofing of buildings and other improvements, and change in agricultural land use as stated in Alternative No. 3; and (5) foregoing the implementation of a project.

A discussion of each alternative follows:

Alternative No. 1 - Alternative No. 1 consisted of only applying the land treatment measures as proposed in the project action. The impacts of the application of land treatment measures are discussed under environmental impact of the proposed project action. Average annual floodwater, flood plain erosion, and indirect damages would be reduced from \$182,610 to \$182,460, or a reduction of 0.1 percent. The volume of sediment being delivered to the mouth of the watershed would be reduced from 23 acrefeet to 21 acre-feet annually, a reduction of 9 percent. This alternative would have very little effect in reducing flood plain scour on the cultivated flood plain and in reducing the volume of sediment produced by this process. Effects on fish and wildlife would generally be the same as the planned project. The adverse impacts that would be caused by installation of the structural measure would be eliminated. The estimated cost of this alternative is \$32,300.

Alternative No. 2 - Alternative No. 2 consisted of applying land treatment for watershed protection, regulation of new development in the flood hazard area to prevent damages to new construction, and providing flood insurance to reduce the economic loss to an individual or small business. Flood damages to both the agricultural flood plain and to the urban properties along San Felipe Creek would be reduced essentially the same as in Alternative No. 1. The total average annual flooding would be reduced from 257 acres to 244 acres or a reduction of 5 percent. A total of 351 homes and 35 businesses would still be subject to flooding above floor level from a 100-year flood event.

Sediment concentrations in runoff leaving the watershed would be reduced from 8,000 milligrams per liter to 7,000 milligrams per liter, a reduction of 12.5 percent. Flood insurance would not reduce flooding and the resulting damages, but would reduce the risk of large economic losses by individual flood victims. Flood insurance would not eliminate the interruptions in the daily lives of the residents or the loss of much irreplaceable property. Restricting new development into the flood plain would prevent the flood damage from increasing. Effects on fish and wildlife would generally be the same as Alternative No. 1.

Alternative No. 3 - Alternative No. 3 consisted of purchase of urban flood plain areas with relocation of homes, businesses, and improvements, and changing the present use of agricultural land to one that is less susceptible to damage by flooding.

The potential land uses, listed in order from highest to lowest susceptibility to flood damage, are urban and built-up areas, cropland, pasture-land, and rangeland. Land used for other purposes, such as transportation systems and wildlife-recreation land, are damaged to varying degrees by flooding, depending upon the type of development and depth and duration of flooding.

In order to reduce the need for flood protection it would be necessary to relocate 351 homes and associated improvements, and 35 business establishments to assure flood-free protection to floor levels from a 100-year event within the urban area of Del Rio, and change the land use on about 150 acres of land used for growing crops. The land could be used for rangeland, pastureland, or for wildlife-recreation land if extensive developments were not installed.

This alternative would reduce the actual monetary damage caused by floodwater, sediment, and erosion. Changing the land use from cropland to rangeland would reduce the food supply for many species of wildlife that are present in the watershed. Damages to the transportation system would continue at approximately the same rate because it was determined to be impracticable to move the transportation system out of the flood hazard area. The economic returns to the owners and operators of the 440 acres of agricultural land would be reduced by about \$11,900 annually if the land use were changed to rangeland. The concentration of sediment in runoff leaving the watershed would continue at about 8,000 milligrams per liter.

The relocation of 351 residences and 35 businesses would require changed land use on the land needed for relocations, which would undoubtedly create adverse impacts on wildlife resources, contribute to noise and air pollution, and adversely affect the other businesses in Del Rio.

It is estimated the out-of-pocket costs of this alternative would be \$5,518,000.

The deterioration of the cultivated flood plain soils by scour would continue until the cumulative effects of this damage forced land use conversion to less productive use.

The need to use 488 acres of land for installation of the structural measure and the resultant adverse impacts to wildlife and other resources would be eliminated.

The opportunity to realize about \$167,880 in average annual net benefits would be foregone and would allow the over-all environment to deteriorate.

Alternative No. 4 - This alternative consisted of floodproofing existing buildings and improvements and changing the land use on agricultural land in the flood hazard area as in Alternative No. 3.

A reconnaissance-type survey of urban properties indicated that complete floodproofing could be accomplished on only a small portion of the improvements because of the type of construction and the depth and velocity of expected flooding. Many of the improvements could be expected to be washed off their foundations. The impacts of changing the agricultural land use on sediment concentrations in runoff and effects to wildlife would be essentially as in Alternative No. 3.

<u>Alternative No. 5</u> - Alternative No. 5 consisted of foregoing the implementation of a project.

This would delay the application of land treatment measures, which would delay the impact these measures have on reducing sediment production from the watershed and would also delay the impact these measures have in reducing flood damage. However, it is reasonable to expect that the landowners and operators would eventually install the land treatment measures to maintain the productivity of their lands.

Flooding would continue, resulting in damage to the agricultural land, urban and built-up areas in Del Rio, and the transportation system.

The removal of existing habitat on areas needed for the structure would be eliminated. The priority of technical assistance to land users for land treatment measures beneficial to wildlife would be reduced.

The alternative of not implementing the project would result in about \$167,880 in net benefits being foregone each year and would allow the over-all environment to deteriorate.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Most of the land in the watershed is primarily devoted to agricultural production and is not expected to change. It is expected that the residential density in the flood plain will remain static with or without the implementation of the proposed project. Without the project,

human suffering and degradation and deteriorating effects upon human life will have a direct negative impact upon the entire community.

The primary objectives of the project are to provide at least adequate conservation treatment, improvements, and productivity to allow a decent standard of living for the present; and preserve and improve the land, water, and other environmental resources for future generations.

With the proposed project installed, the long-term habitability and contribution to the economic well-being of the area will be improved with only minimal detriment to a few features of the natural environment. In total, the natural environment and aesthetic values of the area will be improved over those that would exist in the long term without the project. The project will reduce erosion, flooding, and sedimentation. Current agricultural productivity will be maintained and improved. Even after the designed life of the project of 100 years, the project will still be effective in conserving land and water resources, and protecting human environmental qualities.

The San Felipe Creek Watershed is within the Rio Grande Basin. The Rio Grande drains portions of the states of Colorado, New Mexico, and Texas, as well as Mexico. The total area of the basin is about 182,215 square miles, of which 88,968 square miles is in the United States and 93,247 square miles is in Mexico. The area within Texas tributary to the Rio Grande totals 48,259 square miles, of which 8,214 square miles are non-contributing. 1/2 The Rio Grande drainage area in Texas is equal to 18.4 percent of the total area of Texas. Within the Texas portion of the basin, mean annual precipitation varies from about 8 inches in the upper portion to about 26 inches at the mouth.

There are 25 watersheds located within the Texas portion of the Rio Grande Basin on which watershed projects have been installed, approved for operations, or appear to be feasible for planning. Construction of all planned structural measures have been completed in Al watersheds. Three projects have been approved for operations, six are currently being planned, and five appear to be feasible for planning.

The total drainage area of the 25 watersheds is about 3,034 square miles, or about 6.28 percent of the basin area in Texas, 3.41 percent of the basin area in the United States, and 1.66 percent of the total basin. Three of the watersheds, two of which are approved for operations and one is being planned currently, are located within closed basins, or noncontributing areas of Texas. The total drainage area of these watersheds is about 739 square miles. Of the five watersheds that appear to be feasible, applications for planning assistance, under Public Law 566, have been made to the Texas State Soil and Water Conservation Board on two, and applications for assistance under the Resource Conservation and Development Program have been made on two small projects.

^{1/} The Texas Water Plan, Texas Water Development Board, Austin, Texas November 1968.

The Texas Water Plan (Summary) indicated that in 1968 there were six major reservoirs either existing or under construction within the Texas portion of the basin which have total capacities of 5,000 acre feet or more. The Texas Water Plan does not include other proposed or potential major reservoirs.

There are 55 floodwater retarding structures, 13.6 miles of channel work, and 7.1 miles of floodwater diversion constructed or planned in the 14 watershed projects that are constructed or approved for operations. It is estimated that if all the remaining projects that appear feasible were installed, a total of about 91 structures, 103 miles of channel work, and 8 miles of floodwater diversions would be constructed within the Texas portion of the basin. The total drainage area controlled by floodwater retarding structures would be about 1,965 square miles or 4.1 percent of the total basin in Texas. Of the 1,965 square miles, a total of about 490 square miles is located within closed basins, or noncontributing areas to the Rio Grande.

On a basin-wide basis, the works of improvement proposed in this project will not result in a significant cumulative effect upon the environment because of the small total area of all potential watershed projects in relation to the total area of the basin and the great diversity of project locations.

San Felipe Creek enters the Rio Grande about 12 miles downstream from Amistad Reservoir. Any cumulative effects resulting from the installation of a project on San Felipe Creek watershed on the streamflow of the Rio Grande will be associated only with other watershed projects that enter the Rio Grande within the river reach between International Amistad Reservoir and International Falcon Reservoir which is located about 200 airline miles downstream. The total intervening contributing drainage area between these reservoirs is about 38,059 square miles, of which about 5,070 square miles are in Texas.

Only one watershed impacting on this river reach has been authorized for operations. The two planned floodwater retarding structures, with a combined drainage area of 8.65 square miles have been constructed. Only three watershed projects, including San Felipe Creek watershed, that would effect the Rio Grande in this reach appear to be feasible. It is estimated that if all three projects were installed, a total of 27 floodwater retarding structures, and 87 miles of channel work would be constructed. The total drainage area of the constructed and potential structures is about 159 square miles, or 0.42 percent of the total contributing area. The cumulative impact of total potential watershed development on streamflow is not significant because of the extremely small area in relation to the impact area.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The project will commit about 488 acres now being used primarily for agriculture (rangeland) to the following uses: (1) 40 acres in dam and emergency spillways and (2) 448 acres in sediment and flood pools. The commitment of labor and material resources associated with construction will be committed irretrievably.

No other permanent commitment of resources is known to be required for this project.

CONSULTATION WITH APPROPRIATE FEDERAL AGENCIES AND REVIEW BY STATE AND LOCAL AGENCIES DEVELOPING AND ENFORCING ENVIRONMENTAL STANDARDS

General

The application for assistance for the San Felipe Creek watershed was submitted to and approved by the Texas State Soil and Water Conservation Board. The plan was developed in full consultation and coordination with all interested agencies and individuals. Written notification of initiation of work plan development was sent to all federal, state, and local agencies that might have an interest in the project, soliciting information, comments, and participation. Contacts were made with several agencies during planning to obtain information and assistance.

The Bureau of Sport Fisheries and Wildlife, U. S. Department of the Interior, prepared a reconnaissance report on the San Felipe Creek watershed describing the fish and wildlife resources in the project area, the effects of the proposed project, and recommendations for maintaining and enhancing the fish and wildlife resources of the watershed.

The Texas State Historical Commission was contacted to determine if there were any known archeological or historical sites either listed on, or nominated to, the National Register of Historic places that would be adversely affected by the installation of measures included in the project. Archeologists from the Texas Archeological Salvage Project carried out field investigations to locate and evaluate archeological resources that will be affected by the project.

Representatives of the sponsoring local organizations contacted landowners for permission to survey and to explain how the project would affect their lands. The sponsors carried on an active public information program including public meetings in an effort to inform all interested agencies and individuals, and solicit public reaction and participation as the project was formulated.

On May 22, 1972, prior to the preparation of the final plan, an informal field review was held in the watershed, at which time interested agencies were invited to present their views and recommendations either orally or

in writing. The plan and environmental statement have been prepared in consideration of such comments and recommendations as were provided by agencies who reviewed the plan.

The following federal agencies were requested to review and submit comments and recommendations:

U. S. Department of the Army

U. S. Department of Commerce

U. S. Department of the Interior

U. S. Department of Health, Education, and Welfare

U. S. Department of Transportation

Environmental Protection Agency

Federal Power Commission

Advisory Council on Historic Preservation

The following state and local agencies were requested to review and submit comments and recommendations:

Division of Planning Coordination (State agency designated by Governor and State Clearinghouse)

Middle Rio Grande Development Council (Regional Clearinghouse)

Discussion and Disposition of Each Comment on Draft Statement

All of the above agencies, with the exception of the U.S. Department of Commerce and the Federal Power Commission, submitted comments on the Draft Environmental Impact Statement. The responding agencies' comments and the disposition for each are as follows:

U. S. Department of the Army Corps of Engineers

Comment: The Department, after review of the Work Plan, does not

foresee conflict with any of its projects or current proposals

and considers the Draft Environmental Impact Statement

satisfactory.

Response: Noted

U. S. Department of Transportation

Comment: After reviewing the Work Plan and Draft Environmental Impact

Statement, the Department had no comment to offer or any

objection to the project.

Response: Noted

Advisory Council on Historic Preservation

Comment: The Council stated that it expects the Soil Conservation

Service to do everything possible to insure retention and preservation of archeological resources within the project

area.

Response: Noted

Comment: The Advisory Council suggested that a copy of the State

Historic Preservation Officer's comments concerning the effect of the undertaking upon historical, cultural, archeological, and architectural resources be included in

the Final Environmental Impact Statement.

Response: The Texas State Historical Commission's (Historical

Preservation Officer) letter of comments is included in the Final Environmental Impact Statement in Appendix B, Letters of Comment Received on the Draft Environmental

Impact Statement.

Environmental Protection Agency

Comment: The Agency asked for more discussion of project effects on

underground water supplies.

Response: The project is not expected to have a significant impact on

ground water. If there is an increase in ground water recharge, the increase is not expected to exceed 100 acre-feet on an average annual basis. The present quality of runoff available for recharge is considered to be good. This condition will be maintained with implementation of procedures shown in the Final Environmental Impact Statement for protecting San Felipe

Springs and watershed runoff from urban and industrial encroachment, sediment, pesticides, etc. No changes were

made in Environmental Impact Statement.

Comment: The Agency indicated the Final Environmental Impact Statement

would be strengthened by a discussion of upstream water quality and how the project will provide incentives to

alleviate those problems which presently exist.

Response: Information on present water quality, potential for urban and

industrial encroachment after construction, and assistance in using pesticides has been included in appropriate sections of

the Final Environmental Statement.

Comment:

The Agency stated if herbicides are to be used for control of vegetation in the vicinity of the floodwater retarding structure, the Final Environmental Impact Statement should list the names of the herbicides with the Federal registration number and the intended use.

Response:

Presently it is not known if herbicides will be used to control vegetation. However, if the use of herbicides would be more desirable in lieu of mechanical or hand cutting methods and still not jeopardize environmental quality factors (including water quality in San Felipe Springs and runoff), then it is possible they will be used. The names of herbicides that could be used have not been determined. Before a herbicide is used, it must meet State and local statutes and standards regulating their use which will compliment any other efforts by the sponsoring local organizations to maintain or enhance environmental quality. Additional discussion and information has been added to the Operation and Maintenance section of the Final Environmental Impact Statement in regard to the handling, storage, and application of chemicals in the vicinity of the floodwater retarding structure.

Department of the Interior

Comment:

The Department stated the work plan is satisfactory from a fish and wildlife standpoint and it is pleased to note that the plan incorporates the fish and wildlife measures recommended in its March 27, 1969 report submitted to the Soil Conservation Service. Further, the project will not adversely impact upon any existing proposed or known potential units of the National Park System or any known historic, natural, or environmental education sites eligible for the National Landmark Programs.

Response:

Noted

Comment:

The Department stated the draft Environmental Impact Statement does not adequately describe the environmental setting of the project or the environmental impact of the project on fish and wildlife; it could find no mention of threatened or endangered wildlife species found in the watershed or the project's effects on them.

Response:

Additional discussion of project effects on fish and wildlife and descriptions of wildlife resources have been added. Data concerning threatened species and the project's effects on them have been included.

Comment:

The Department stated it feels the ecological importance of the free-flowing San Felipe Springs located in this semi-arid area and the project's effects on the spring and surrounding habitat have not been fully described in the Draft Environmental Impact Statement.

Response:

Additional information in this regard has been included in the Final Environmental Impact Statement.

Comment:

The work plan does not make any reference to mineral resources or the effects of the project on their present or future recovery; however, the Draft Environmental Impact Statement notes that limestone, gravel, and clay are important resources in the watershed. The Draft Environmental Impact Statement further reports that the sponsoring organizations of the city, county, and conservation district recognize the importance of limestone, gravel, clay, petroleum, natural gas, and natural gas liquids in the watershed and vicinity and that the project will not adversely affect or be adversely affected by their recovery. Because of the relatively small area involved, the nature of the improvements, and the apparent concern of local officials for mineral resources, it believes the Draft Environmental Impact Statement is adequate in the area of minerals.

Response:

Noted

Comment:

The Draft Environmental Impact Statement evaluates natural foundation materials at the site of the flood retarding structure as having sufficient shear strength and low settlement potential. It also recognizes the permeability of the alluvium and the underlying Georgetown Limestone, indicated by a sink hole in the forebay area of the east emergency spillway and spring flow about 500 feet downstream, and suggests that foundation drains will be needed. This problem and others that may be encountered during detailed geologic exploration and laboratory tests called for in the Draft Watershed Work Plan should be amenable to mitigation through application of accepted engineering practices.

Response:

Noted

Comment:

The Department stated that the Draft Environmental Impact Statement points out the fact that the reservoir may be a potential source of pollution to San Felipe Springs. It also states that the sponsors are interested in working with the Water Quality Board to take the necessary steps to protect the water. An elaboration of the necessary steps should be included. Because the reservoir is to be built close to the springs and apparently up the hydraulic gradient, it appears that the reservoir would form, in effect, a gigantic funnel to collect any runoff and direct it to the

immediate vicinity of the springs. The first flush of water into the reservoir will undoubtedly contain a considerable amount of pollutants which would be injected almost directly into the springs. The statement should include a full appraisal of this matter.

Response:

Additional information has been included in the Final Environmental Impact Statement. It should be noted that under present conditions, runoff from the watershed above the springs must flow past the immediate vicinity and, during flood stage, over the springs.

Comment:

The Department stated it feels a more objective examination and analysis of the project and its potential environmental impacts are needed. The Draft Environmental Impact Statement does not present sufficient data for the reader to understand or evaluate the potential impacts which could occur from implementing the project. The Final Environmental Impact Statement could be improved by adding environmental setting descriptive data, a more detailed analysis of the impacts of the proposed project, and the impacts associated with each alternative.

Response:

The statement has been revised to include more specific detail in the aforementioned sections.

Comment:

The Department stated that there were conflicting statements on various sections as to whether or not ponds would hold water and that some clarification of permanent water in the ponds should be given.

Response:

The narrative in the Final Environmental Impact Statement has been revised to remove the apparent ambiguity and to provide clarification.

Comment:

Mention should be made of the endangered and threatened wildlife species in the watershed vicinity.

Response:

A description of threatened species is provided in the Final Environmental Impact Statement.

Comment:

The Department stated the Environmental Setting section does not contain sufficient detail to allow us to determine what the setting actually consists of, or to assess what impacts the project may have on the environment. To help the reader more easily comprehend the facts being presented, it suggested discussing the existing environment, utilizing the following headings: non-living, living components, ecological interrelationships, and human values.

Response:

This section has been expanded to provide additional detail, especially in the areas of vegetation, wildlife, and ecological relationships. The format is arranged as suggested by guidelines provided by the Federal Register, Volume 39, No. 107, Part III, June 3, 1974.

Comment: The Department stated that more specific terms to describe

soils depth, nutrient properties, and erosion potential would

have been useful.

Response: The terms used are specific technical terms, however, these

terms have been defined in the Final Environmental Impact

Statement.

Comment: The Department stated that water quality in San Felipe Creek

was not described in the Draft Environmental Impact Statement.

Response: Information concerning quality of water from San Felipe Springs

and runoff has been included in the Final Environmental Impact

Statement.

Comment: The Department stated it was unclear as presented in the Draft

Environmental Impact Statement, as to the type, amount, and condition of the vegetation in the area. Because the project involves land treatment measures, an adequate vegetative description is needed. A separate description of each of the four rangeland sites, plus a location map, would help improve the ENVIRONMENTAL SETTING section. Use of specific terms to describe the vegetative conditions would benefit the reader. The Final Environmental Impact Statement could be improved by

adding a discussion of land use suitability.

Response: A more detailed vegetative description and a discussion of

range sites have been added. The location of each of the four range sites is determined primarily by edaphic and topographic factors. A description of the setting for each

range site has been added.

Comment: The Rio Grande darter and the Devil's River minnow should

be included among the fish species in the wa ershed.

Response: This section has been expanded to include the Rio Grande

darter and the Devil's River minnow.

Comment: The Department suggested acknowledging that the watershed lies

within the known range of the southern bald eagle, the American peregrine falcon (both of which are listed as endangered by the Department of the Interior), the jaguarundi and ocelot (both of which are listed as threatened by the Bureau of Sport Fisheries and Wildlife). Also, the Rio Grande darter, which is classified as a peripheral fish by the Bureau of Sport

Fisheries and Wildlife, is listed as threatened.

Response: This paragraph has been expanded to include the bald eagle,

American peregrine falcon, jaguarundi, ocelot, and Rio Grande

darter.

Comment:

The Department stated wildlife descriptions leave the impression that song birds, small mammals, and reptiles do not exist in the area. The Final Environmental Impact Statement could be improved by discussing, or at least listing, all the known animal species of the project area.

Response:

A more complete listing of the major vertebrate species including fish, mammals, birds, reptiles, and amphibians has been added. It is felt that a listing of all known animal species would be of limited usefulness and is unjustified, particularly in the case of invertebrate animals.

Comment:

A discussion of ecological interrelationships is needed in order to assess the potential impact of the project on wildlife. Consideration of the relationship of the wildlife to the vegetation in the area, dependence of various animal species on different vegetative species, and successional changes taking place on the project area would strengthen the Final Environmental Impact Statement.

Response:

A more detailed discussion of vegetative trends and forage quality of individual plants for various species of livestock and wildlife has been added to the Final Environmental Impact Statement.

Comment:

The Draft Environmental Impact Statement states there is no improper use of land in the watershed. However, in several places prior to this statement, the Draft Environmental Impact Statement uses such terms as poor to fair condition, and overgrazing is discussed. These terms, to the Department, denoted improper land use. A reanalysis of the use of these terms and particularly the improper use of land statement was suggested.

Response:

The Final Environmental Impact Statement has been revised to indicate there is no land being used for purposes to which it is unsuited. A more detailed description of the status of land treatment has been included in the Final Environmental Impact Statement.

Comment:

The wildlife habitat that could be enhanced as mentioned in the Problems Relating to Water Management section should be qualified to indicate for which species.

Response:

This sentence has been revised in the Final Environmental Impact Statement to indicate enhancement of habitat for specific species.

Comment:

The Department stated the location and removal of the fill material and limestone rock for the floodwater retarding structure was not discussed and that the removal of these materials could have serious impact on wildlife, soil, water, and air quality.

Response:

The embankment fill materials will be obtained from the sediment pool area and required emergency spillway excavation. This information has been included in the Final Environmental Impact Statement. As indicated in the Final Environmental Impact Statement, all phases of construction operations will be monitored constantly by a construction inspector and the structure will be periodically inspected after installation. The monitoring and inspections are to alleviate any undesirable impacts on wildlife, soil, water, and air quality as well as insure the proper functioning of the structure as a flood prevention measure.

Comment:

It would be helpful if "needs", as used in the Draft Environmental Impact Statement in the PLANNED PROJECT section, were qualified to show what is needed in regard to land treatment.

Response:

This sentence has been expanded in the Final Environmental Impact Statement to include a purpose for needed treatment. Detailed descriptions of needs and planned treatment are provided elsewhere in the document.

Comment:

The Department stated that to objectively review the Draft Environmental Impact Statement, it would have been helpful to know acreages involved in brush control that will be compatible with wildlife needs, acreages of barren areas in the sediment pool and adjacent soils that will be seeded with herbaceous vegetation, the number of watering systems to be built with devices to provide ground level access for would diffe, and the number of ponds which will be constructed and stocked with fish.

Response:

This section has been revised in the Final Environmental Impact Statement to better describe planned land treatment practices and to reflect their effects on wildlife resources.

Comment:

The location of the emergency spillways in relation to San Felipe Springs should be described. This would help in determining the effect of the project on fish and wildlife.

Response:

The location of the emergency spillways relative to San Felipe Springs has been included in the Final Environmental Impact Statement.

Comment: The location of the borrow site and a description of its

vegetative cover should be described. This information would

be helpful in assessing the impact of the project.

The source of embankment fill material will be in the sediment Response:

pool and from required excavation in the emergency spillways. This information is included in the Final Environmental Impact Statement as well as a description of vegetation on these

areas.

Comment: The Final Environmental Impact Statement would be improved by

a more objective and detailed analysis of the potential impacts

which could result from project implementation.

More information has been included in the ENVIRONMENTAL IMPACT Response:

section of the Final Environmental Impact Statement.

Comment: The Draft Environmental Impact Statement states that an increase

> in density of grasses and forbs would improve habitat conditions for big game. Depending on what habitat factors are limiting big game populations, increased density may not improve big

game habitat conditions.

Response: This statement has been revised in the Final Environmental Impact

Statement to reflect that an increase in quality and quantity of vegetation will result from application of proper grazing

management.

Comment: The Department stated the effects of removing material for

construction of the dam should be analyzed.

No significant impacts are expected from the removal of materials Response:

> for construction of the dam. These materials will be obtained from the sediment pool and required excavation in the emergency spillway areas. No changes were made in the Final Environmental Impact Statement.

The effects on water quality and on San Felipe Springs from Comment:

construction of a dam should be included in the discussion of

impacts.

Information concerning the impacts on water quality has been Response:

included in the Final Environmental Impact Statement.

The Department stated that the Draft Environmental Impact Comment:

> Statement indicates that project installation will eliminate brush species, and land treatment measures will benefit big and upland game by providing more forage and browse. The

latter statement appears to conflict with the fact that brush

will be eliminated on the project area. This should be reanalyzed.

This section has been revised to indicate the expected results Response:

of brush management on various species of wildlife.

The Soil Conservation Service should be prepared to fund Comment:

> needed excavation to mitigate the adverse effects of the proposal on cultural resources if the National Park Service request

for funds for this purpose is not granted.

Response: The Soil Conservation Service will adhere to its statutory

obligations in regard to mitigation of adverse effects on

archeological resources.

The Department stated that increasing the density of grasses Comment:

> will not improve habitat for big game and would have an adverse effect on small-game habitat and suggested changing the narra-

tive to indicate this.

Response: The narrative in the Final Environmental Impact Statement has

been revised to better describe the effects of proper grazing

and increased density of vegetation on various species of wildlife.

The Department stated it would be helpful to know the concen-Comment:

tration of suspended sediment leaving the watershed, including the flow from San Felipe Springs, when evaluating the effects

of the project on the downstream fishery.

This information has been included in the Final Environmental Response:

Impact Statement and Work Plan.

Comment:

The ENVIRONMENTAL IMPACT section should be expanded to include

the project's effects on endangered and threatened wildlife species found in the watershed. It would be helpful to know

if the unique fishery will be adequately protected during construction of the project; will the use of herbicides for main-

tenance of the floodwater retarding structure affect the wildlife

populations downstream; will water temporarily held in the

structure increase in temperature so when it seeps into the aquifer the temperature of the discharge will be affected; will

agricultural chemicals be introduced into the aquifer by seepage from the impounded waters; will the rate of discharge

from San Felipe Springs be affected by the structure; will the reduced level and volume of floodwaters affect the downstream

fishery, the acreage of idle or eroded land that will be

planted with woody and seed-bearing vegetation, and the acreage of brush control that will not significantly limit the cover

and movement of wildlife.

Response:

The Environmental Impact section of the Final Environmental Impact Statement has been expanded to better define the project's effects on fish and wildlife, including effects on threatened species and downstream habitat. No significant change is expected to occur in the temperature of water in the aquifer as a result of the relatively small amount of water which will be contributed by recharge from the floodwater retarding structure. Data concerning pesticides, recharge, and precautions to be observed during construction are found in appropriate sections of the final document.

Comment:

A definite statement is needed that brush control with wildlife considerations will be encouraged if brush control with wildlife considerations is to be listed as a favorable environmental effect.

Response:

A more detailed explanation of assistance to be provided in application of brush management has been added to the planned project section.

Comment:

There appears to be some inconsistency regarding permanent water in ponds in the FAVORABLE ENVIRONMENTAL EFFECTS section.

Response:

The narrative in the Final Environmental Impact Statement has been revised to remove the ambiguity.

Comment:

The Department stated that mention of the project's effects on endangered and threatened wildlife species should be made under the appropriate section.

Response:

The project is not expected to affect threatened species significantly; therefore, a favorable or adverse effect is not contemplated.

Comment:

The Department stated many of the benefici. I impacts are based on the premise that proper land use will be practiced by the landowner, especially grazing management. Unless there is some measure to insure proper land use, including livestock grazing, there may be some validity in discussing impacts which would occur from the project if proper land management measures were not practiced. Some of these impacts would be associated with: creating additional livestock watering facilities which could result in additional overgrazing; and removal of all brush instead of selective brush removal, which would seriously impact wildlife populations.

Response:

There is no legal way to insure proper land use or the application of any particular combination of land treatment measures. It is reasonable to project that land users will practice proper land use and apply land treatment measures wisely in view of the past record. Resource plans have been developed for about 71 percent of the watershed area and land users have agreed to maintain or apply needed conservation measures using technical assistance provided through the Devils River Soil and Water Conservation District.

Comment:

The Department commented that discussion of the alternatives and associated impacts were not adequate in detail to allow comparisons of net residual impact of each alternative with other alternatives on the proposed action. It was suggested that a more in-depth discussion of alternatives would improve the final statement. The Department felt that several other alternatives should merit discussion:

(1) implement proper grazing measures without vegetative manipulation and construction of the dam; and (2) construct the dam to maintain a recreation pool and provide public access to the pool.

Response:

Suggested alternatives were considered and determined to be unfeasible or not viable for the following reasons: As stated in the document, about 1,000 acres of brush management is expected to be installed during the project installation period. This practice will be applied on areas which do not have adequate ground cover to protect the soils resource from erosion or to provide significant forage for livestock or food for wildlife. Grasses and plants cannot be established for erosion control, wildlife food and proper grazing without brush management. The construction of a dam that would impound wate for public recreational purposes has merit. However, the are geological problems in the foundation of the dam and in the pool areas that preclude the serious consideration of this alternative. The structure is not expected to hold water. This is because the soil materials and bedrock in the foundation area and pool areas are pervious. It might be possible, with grouting, to make the foundation area hold water, however, it would be highly impractical, if not impossible, to make the entire recreation pool area hold water through the use of known sealing methods.

Comment:

The Department stated the RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY section should include a discussion on a basin-wide basis, of the cumulative effect of the project

on endangered and threatened wildlife species. A discussion of this type is of importance because of the limited habitat that is available or will support these species.

Response:

The project, as formulated, is not expected to have any significant effects, within the project area or basin-wide, short-term or long-term, on endangered and threatened wild-life species. No change has been made in the Final Environmental Impact Statement.

Comment:

The Department stated the discussion under this section (Relationship Between Local Short-term Uses and Man's Environment and the Maintenance and Enhancement of Long-term Productivity) indicates to us that a programmatic or basinwide environmental statement should be prepared for the Texas portion of the Rio Grande Basin. By preparing environmental statements on individual watersheds, the total impact is not analyzed. The impact of each small watershed project may be minor, but, taken as a whole, the many proposed projects could have a major impact. As stated, there are a total constructed or estimated 146 floodwater retarding structures; 117 miles of channelization (channel improvement); and 15 miles of floodwater diversion. This does not include the many thousands of acres of land treatment measures that will be proposed. We would recommend that an environmental statement be prepared on the basin to adequately examine the total environmental impacts.

Response:

The following is from the section referred to of the Draft Environmental Impact Statement. Underlining has been added for emphasis.

There are 49 floodwater retarding structures, 13.6 miles of channel work, and 2.3 miles of floodwater civersion constructed or planned in the 12 watershed projects that are constructed or approved for operations. It is estimated that if all the remaining projects that appear feasible were installed, a total of about 97 structures, 103 miles of channel work, and 13 miles of floodwater diversions would be constructed within the Texas portion of the basin. (The total length of the floodwater diversions has been determined to be about 15 miles and is shown accordingly in the Final Environmental Impact Statement). The total drainage area controlled by floodwater retarding structures would be about 1,965 square miles or 4.1 percent of the total basin in Texas. Of the 1,965 square miles, a total of about 490 square miles is located within closed basins, or noncontributing areas to the Rio Grande.

On a basin-wide basis, the works of improvement proposed in this project will not result in a significant cumulative effect upon the environment because of the small total area of all potential watershed projects in relation to the total area of the basin and the great diversity of project locations.

There is a misunderstanding revealed in the comment that, there are a total constructed or estimated 146 floodwater retarding structures; 117 miles of channel-ization (channel improvement); and 15 miles of floodwater diversion. There is a possibility for only 97 floodwater retarding structures, 103 miles of channel work, and 13 miles of floodwater diversion if the installed, currently being planned, and potential watershed projects should be considered as a whole. These structures would be interspersed throughout the vast drainage area from Hudspeth County to Star County inclusive.

Two watersheds in the non-contributing area have been authorized for construction operations since the Draft Environmental Impact Statement was distributed for review and comments. Presently, 55 floodwater retarding structures, 14.1 miles of channel work, and 4.8 miles of floodwater diversion are installed or planned in the 14 watershed projects that are constructed or approved for operations.

The Soil Conservation Service offers technical assistance and expertise in planning and installation of land treatment measures. However, the arrangements for financing and ultimate decision to install land treatment is entirely the prerogative of the land users. Factors such as the availability of funds, market conditions for crops and livestock, weather, etc. influence land users immeasurably as to how they will use their land and what land treatment they will install. It would be highly speculative to predict the environmental impact of land treatment on such a large and diverse area as the Rio Grande Basin in Texas.

Based on the above, a program Environmental Impact Statement for the entire Rio Grande Basin is not considered necessary and is not being prepared.

Comment:

The Department requested that the report of their Bureau of Sport Fisheries and Wildlife accompany the watershed work plan when it is forwarded for Congressional consideration.

Response:

The report will accompany the watershed work plan when it is transmitted to the Congress.

U. S. Department of Health, Education and Welfare

Comment:

Vector control measures should be considered in regard to construction and operation and maintenance of the floodwater retarding structure.

Response:

A discussion relative to vector control has been added to the Final Environmental Impact Statement in the PLANNED PROJECT-Structural Measure section.

Texas Water Rights Commission

Comment:

The Commission staff stated that the Draft Environmental Impact Statement and Work Plan appear to be in satisfactory compliance with the relevant provisions of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566, 68 Stat. 666 as amended) and Section 102 (2)(C) of the National Environmental Policy Act of 1969.

Response:

Noted

Comment:

The Commission stated that the project would be enhanced if nonstructural measures such as restrictions on construction in flood hazard areas, flood insurance, purchase of urban flood plain with relocation of existing facilities, change in land use, and floodproofing of existing facilities were concurrently effected with the establishment of the land treatment measures and construction of the floodwater retarding structure. All reasonable nonstructural or administrative measures should be adopted to supplement the more basic structural and non-structural land treatment elements of the watershed project to preclude unjustified total dependence on limited measures for urban flood protection.

Response:

During the planning phase of the project, nonstructural and administrative measures such as those suggested were considered and discussed by the Soil Conservation Service and the Sponsoring Local Organizations. The sponsors are aware of the merits of these measures and will implement them when applicable and practical.

The Final Environmental Impact Statement and Work Plan both contain statements concerning the sponsors' awareness that the project will not provide complete flood-free protection to all urban properties and their efforts to publicize the nature and extent of the remaining flood hazards after project installation.

Comment:

In reference to the RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY section, the Commission stated it is not apparent that only minimal impacts will result from implementation of projects in 25 watersheds, comprising 3,034 square miles, or about 6.28 percent of the Rio Grande Basin Area in Texas. It is not evident that the 97 floodwater retarding structures, 103 miles of channel work, and 13 miles of floodwater diversions constructed or planned, affecting 1,965 square miles, or 4.1 percent of the total Rio Grande Basin in Texas would have no significant environmental, social, economic, and hydrologic impacts. Based on the highly favorable benefit-cost ratio for the San Felipe Creek Watershed, it would appear that

comparably favorable benefit-cost ratios and enhanced environmental conditions would result from the basinwide program.

Response:

Although all of the watersheds that are constructed, authorized for operation, or are being planned have favorable benefit to cost ratios, none have a ratio nearly as high as San Felipe Creek. It is concurred that each separate watershed project results in enhanced social, economic, and environmental conditions. However, these projects are widely interspersed throughout the basin and, on an individual basis, are rather small in scope. The impact of each project is basically limited to its own area of influence and does not accumulate to any significant degree with the other projects.

Comment:

The Commission commented that the water rights in regard to impoundment of water in the floodwater retarding structure should be made unmistakably consistent, and there is not enough emphasis on the requirement for obtaining from the Texas Water Rights Commission the appropriate water rights permits for such use of the reservoir.

Response:

Appropriate discussions in the Final Environmental Impact Statement and Work Plan have been revised to more precisely describe the water holding capabilities of the floodwater retarding structure and place emphasis on the statutory requirement of obtaining pertinent water rights permits from the Texas Water Rights Commission.

Texas State Soil and Water Conservation Board

Comment:

The Board stated in its opinion the project has been thoroughly reviewed and that the Draft Environmental Impact Statement and Work Plan need no further comment.

Response: Noted

Texas Highway Department

Comment:

The Department noted that elevations shown on Figure 2A of the Work Plan do not correspond with the sea level elevations shown in the ENVIRONMENTAL SETTING section of the Draft Environmental Impact Statement; hence, the principal and emergency spillway crest elevations are not clear.

Response:

Elevations shown on Figure 2A of the Work Plan are typical for a floodwater retarding structure. The elevations are not the elevations for the San Felipe Creek site. Sea level elevations shown on Page 2, ENVIRONMENTAL SETTING, of the Draft Environmental Impact Statement, are the range of sea level elevations for this watershed.

Comment:

The Department stated that Figure 2A of the Work Plan indicates a borrow source is to be located downstream from the dam. The Plan of Highway Development for Del Rio published in 1965 proposes the development of a highway connection between U. S. 90-East and U. S. 90-North extending across San Felipe Creek through the area south of the proposed dam near the indicated borrow source. It is very possible that the location of the borrow area will conflict with the proposed highway location. It is recommended that before project implementation, possible conflict be resolved with the Texas Highway Department district engineer in Del Rio.

Response:

Figure 2A is for a typical floodwater retarding structure and not the San Felipe Creek site. No borrow will be obtained from below the site. The proposed highway connection between U. S. 90-East and U. S. 90-North extending across San Felipe Creek will not interfere with the proposed site.

Texas Water Development Board

Comment:

The Board noted the proposed plan does not contemplate the development of water for conservation (water supply) purposes, and will not conflict with the Texas Water Plan. Need for flood control measures along that portion of San Felipe Creek passing through the City of Del Rio is recognized, and it assumes the flood control measures proposed will be sound and environmentally acceptable.

Response:

Noted

Comment:

The Board concurs with the sponsoring agencies intention to work with the Texas Water Quality Board in an effort to prevent possible contamination of groundwater resources in the area.

Response:

Noted

Comment:

The Board stated its staff-level review of Draft Environmental Impact Statement and Work Plan finds them to be sufficiently comprehensive and the intent of Public Law 91-190, Section 102(c) has been fulfilled.

Response:

Noted

The University of Texas at Austin

Bureau of Economic Geology

Comment:

The Bureau stated that the immediate effect of impoundment of water with a high suspended sediment load in the floodwater retarding structure will be recharge of turbid water into

the aquifer system which could adversely affect the water quality of San Felipe Springs.

Response:

These effects have been considered. Land treatment measures when applied will subsequently reduce sediment concentrations in runoff above the floodwater retarding structure. The sponsoring local organizations are keenly aware of sediment and other potential sources of water pollution and intend to work closely with the Texas Water Quality Board to keep contamination at the lowest possible level.

Comment:

Eventually, fine-grained sediment may plug the leaks in the floodwater retarding structure causing an increased rate of sedimentation in the structure. An increased rate of sedimentation will shorten the useful life of the reservoir as a flood control structure.

Response:

Sedimentation rates (present and future) are a basic consideration in the design of any Soil Conservation Service designed floodwater retarding structure. Sediment lost through leakage was not considered in establishing sediment capacity of the structure.

Comment:

The Bureau stated "No alternatives to the project are suggested, but it is interesting to note that a 783-acre reservoir will protect a flood plain of less than 700 acres. A comparison between the costs of the proposed project and costs of relocation and restriction of flood plain development would be illuminating."

Response:

Pages 26, 27, and 28 of the Draft Environmental Impact Statement suggests five alternatives. Alternative Nos. 2 and 3 discuss relocation and restriction of floodplain development and their costs. These alternatives are also included in the Final Environmental Impact Statement. The "reservoir", as stated in the Work Plan and Draft and Final Environmental Impact Statements, will require a total of 488 acres, dam and spillways included, and the flood protection provided for the area that would be inundated by the one percent chance storm (100-year) is 783 acres of agricultural and urban flood plain.

Texas Water Quality Board

Comment:

The staff of the Texas Water Quality Board, after review of the Draft Environmental Impact Statement for the San Felipe Watershed project, concluded that the project would not pose lasting adverse environmental problems.

Response: Noted

Texas Industrial Commission

Comment: The Commission stated that apparently the benefits to be derived from the project outweigh the adverse effects.

Response: Noted

Texas Historical Commission (formerly Texas State Historical Survey Committee)

Comment: The Commission stated it has examined the Draft Environmental

Impact Statement and find that those sections pertaining to cultural (prehistoric, historic, architectual) resources have been carefully and adequately prepared. If the procedures recommended for mitigation of the loss of archeological resources are followed, the agencies involved will have

fulfilled their responsibilities.

Response: Noted

Texas Parks and Wildlife Department

Comment: Based upon a cursory review, the Department offered no

comment.

Response: Noted

Texas Department of Agriculture

Comment: The Department commented, "This project is comparable to

another recently reviewed where housing and business construction was allowed to proceed in a flood prone area. It is possible, however, that flood data on San Felipe Creek may not have been available or accurate in the early stages of urban development along its banks."

Response: Noted

Comment: The Department commented that apparently the construction

planned for the flood plain will satisfy the stated objectives

of the project, the cost to be borne by public funds.

Response: Noted

Middle Rio Grande Development Council

Comment: The MRGDC Project Review Committee reviewed the Draft

Environmental Impact Statement and found it to be consistent with the goals and objectives of comprehensive planning and

the development of the Region.

Response: Noted

LIST OF APPENDIXES

- Appendix A Comparison of Benefits and Costs for the Structural Measures from the Work Plan
- Appendix B Letters of Comment Received on the Draft Environmental Impact Statement

Appendix C - Project Map

APPROVED BY Juril & Thomas

dward E Thomas

State Conservationist

DATE: 1-13-75

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURE

San Felipe Creek Watershed, Texas (Dollars)

1 - T	Cost	Ratio		7.4:1.0		6.6:1.0
	• ••					
Average	Cost	2/		26,860	3,340	30,200
	• ••					0
		Total		198,080		198,080
	6 00	: K3				
3 1/		: Secondary : Total		15,150		15,150
efits		: Sec		15		15
Average Annual Benefits 1/	: Damage : Redevelop-	ment		,270		,270
age	. Re					$\frac{3}{1}$
Aver	Jamage	Evaluation Unit :Reduction:		181,660	uc	181,660 3/ 1,
		t :R	ding		rati	
		on Uni	Floodwater Retarding Structure Number		Project Administration	. 7
		uatio	ater	Н	t Adr	TOTAI
		Eval	Loodw		rojec	GRAND TOTAL

Nonagricultural benefits - current prices (1972); All other benefits adjusted normalized prices, April 1966 Price Base: $\frac{1}{1}$

Installation - 1972 prices ammortized for 100 years at 5.500 percent interest. Operation and maintenance - Adjusted normalized prices (April 1966) 2/

In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$150 annually. 3/

September 1974

Letters of Comment Received on the

Draft Environmental Impact Statement





DEPARTMENT OF TRANSPORTATION UNITED STATES COAST GUARD

Deputy Administrator for Water Resources

mailing address: u.s. coast guard (G-WS/73) 400 seventh street sw washington, d.c. 20500 Phone: 426-2262

1 1 FEB 1974

Mr. Kenneth E. Grant Administrator Soil Conservation Service Department of Agriculture Washington, D. C. 20250

Dear Mr. Grant:

This is in response to your letter of 6 December 1973 addressed to Admiral Bender concerning the draft environmental impact statement for the San Felipe Creek Watershed Project, Val Verde County, Texas.

The Department of Transportation has reviewed the material submitted. We have no comment to offer nor do we have any objection to this project.

The opportunity to review this draft environmental impact statement is appreciated.

Sincerely,

R. I. FRIDE

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DEPARTMENT OF THE ARMY WASHINGTON, D.C. 20310

5 FEB 1974

Honorable Robert W. Long Assistant Secretary of Agriculture Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the Administrator of the Soil Conservation Service, by letter dated 6 December 1973, requested comments on the Watershed Work Plan and Draft Environmental Statement for the San Felipe Creek Watershed, Val Verde County, Texas.

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this office. The draft environmental statement is considered satisfactory.

Sincerely,

Charles R. Ford

Chief

Office of Civil Functions

Charles P. Ford

AUNISONN COL HOLD ON UISTORIC PRESERVATION

WASHINGTON, D.C. 20240-

December 19, 1973

Mr. Kenneth E. Grant Administrator Soil Conservation Service U.S. Department of Agriculture Washington, D.C. 20250

Dear Mr. Grant:

This is in response to your request of December 6, 1973, for comments on the environmental statement for the San Felipe Creek Watershed, Val Verde County, Texas. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that your draft environmental statement appears procedurally adequate, however, we have the following substantive comments to make:

- 1. The Council expects that the Soil Conservation Service, Department of Agriculture will do everything possible to insure retention and preservation of archeological resources within the project area.
- 2. To insure a comprehensive review of historical, cultural, archeological, and architectural resources, the Advisory Council suggests that a copy of the State Historic Preservation Officer's comments concerning the effect of the undertaking upon these resources be included in the Final Environmental Statement.

Sincerely yours,

ann luckar and

Ann Webster Smith
Director, Office of Compliance

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ENVIRONMENTAL PROTECTION AGENCY REGION VI

1600 PATTERSON, SUITE 1100 DALLAS, TEXAS 75201

February 11, 1974

SOL STATE OF THE REGIONAL ADMINISTRATOR

Mr. Kenneth E. Grant Administrator Soil Conservation Service Washington, D.C. 20250

Dear Mr. Grant:

We have reviewed the Draft Environmental Impact Statement and Watershed Work Plan for San Felipe Creek Watershed, Val Verde County, Texas. The project consists of land treatment measures on 2,520 acres and the construction of one single purpose floodwater retarding structure.

The Impact Statement and the Work Plan adequately discuss most of the impacts from this proposed watershed project. We have the following comments for your consideration in the preparation of the final:

- 1. The impact of the project on underground water supplies should be further discussed. Will the project result in additional recharge of the aquifer, and if so what will be the estimated quality and quantity of the recharge?
- 2. You have indicated that the implementation of the project would provide an incentive to control pollution upstream from the floodwater retarding structure. The statement would be strengthered by a discussion of upstream water quality and how the project will provide incentives to alleviate those problems which presently exist
- 3. If herbicides are to be used for the control of undesirable vegetation near the floodwater retarding structure, the statement should list the names of these herbicides, along with the Federal registration number and the intended use.

These comments classify your Draft Environmental Impact Statement as LO-2. Specifically, we have no objections to the proposed project. However, we are requesting more information so that we may fully evaluate its environmental impacts. The classification and the

date of our comments will be published in the <u>Federal Register</u> in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the attachment. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,

Arthur W. Busch Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

10 - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

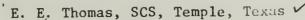
The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.





United States Department of the Interior

OFFICE OF THE SECRETARY WASHINGTON, D.C. 20240

ER-73/1575

FEB 27 1974

Dear Mr. Grant:

Thank you for the letter of December 6, 1973, requesting our views and comments on the work plan and draft environmental statement for the San Felipe Creek Watershed, Val Verde County, Texas.

The work plan is satisfactory from a fish and wildlife standpoint and we are pleased to note that the plan incorporates the fish and wildlife measures recommended in our report to you of March 27, 1969. Further, the proposed work will not adversely impact upon any existing, proposed or known potential units of the National Park System or any known historic, natural, or environmental education sites eligible for the National Landmark Programs.

We have completed our review of the draft statement and submit the following comments for your consideration and use in preparing the final statement for this project.

General Comments

The draft environmental statement does not adequately describe the environmental setting of the project or the environmental impact of the project on fish and wildlife. We find no mention of threatened or endangered wildlife species found in the watershed or the project's effects on them.

We feel that the ecological importance of the free-flowing San Felipe Springs located in this semi-arid area and the project's effects on the spring and surrounding habitat have not been fully described.

Although the work plan does not make any reference to mineral resources or the effects of the project on their present or future recovery, the draft statement, page 2, notes that



limestone, gravel, and clay are important resources in the watershed. Under Environmental Impact, page 24, the statement further reports that the sponsoring organizations of the city, county, and conservation district recognize the importance of limestone, gravel, clay, petroleum, natural gas, and natural gas liquids in the watershed and vicinity and that the project will not adversely affect or be adversely affected by their recovery. Because of the relatively small area involved, the nature of the improvements, and the apparent concern of local officials for mineral resources, we believe the draft statement is adequate in the area of minerals.

The draft environmental statement evaluates natural foundation materials at the site of the flood retarding structure as having sufficient shear strength and low settlement potential (page 13). The statement also recognizes the permeability of the alluvium and the underlying Georgetown Limestone, indicated by a sink hole in the forebay area of the east emergency spillway and spring flow about 500 feet downstream, and suggests that foundation drains will be needed (pages 14-15). This problem and others that may be encountered during detailed geologic exploration and laboratory tests called for in the watershed work plan (page 40) should be amenable to mitigation through application of accepted engineering practices.

The draft statement points out the fact that the reservoir may be a potential source of pollution to San Felipe Springs (page 15). It also states that the sponsors are interested in working with the Water Quality Board to take the necessary steps to protect the water. An elaboration of the necessary steps should be included. Because the reservoir is to be built close to the springs and apparently up the hydraulic gradient, it appears that the reservoir would form, in effect, a gigantic funnel to collect any runoff and direct it to the immediate vicinity of the springs. The first flush of water into the reservoir will undoubtedly contain a considerable amount of pollutants which would be injected almost directly into the springs. The statement should include a full appraisal of this matter.

We feel that a more objective examination and analysis of the project and its potential environmental impacts is needed. As presently written, the EIS does not present sufficient data for the reader to understand or evaluate the potential impacts which could occur from implementing the project. The final statement could be improved by adding environmental setting descriptive data, a more detailed analysis of the impacts of the proposed project, and the impacts associated with each alternative.

Comments on the specific sections of the statement follow.

Summary Sheet

Section V, numbers (3) and (5), indicated that there will be permanent water in ponds. Also, on page 25, number 14., c. and e., it is indicated that there will be permanent water in the ponds. However, page 11, fourth full paragraph, last sentence, and page 12, fourth paragraph, last sentence, indicate that the ponds may not hold water. This appears to be contradictory. Some clarification of permanent water in the ponds should be given.

Also, mention should be made of the endangered and threatened wildlife species.

Environmental Setting

This section does not contain sufficient detail to allow us to determine what the environmental setting actually consists of, or to assess what impacts the project may have on the environment. Use of a different arrangement of the material may help the reader better grasp the facts being presented. We would suggest discussing the existing environment, utilizing the following headings: non-living, living components, ecological interrelationships, and human values.

Use of more specific terms to describe soil depth, nutrient properties, erosion, would have been useful. Water quality in San Felipe Creek was not described.

It was unclear to us as to the type, amount, and condition of the vegetation occurring in the area. As the project involves land treatment measures, an adequate vegetative description is needed. A separate description of each of the four rangeland sites, plus a location map, would help improve this section. Use of specific terms to describe the vegetative condition would benefit the reader. The statement could be improved by adding a discussion of land use suitability.

Page 4, sixth paragraph: The paragraph should be expanded to include the Rio Grande darter and the Devil's River minnow.

Page 5, first full paragraph: We suggest acknowledging that the watershed lies within the known range of the southern bald eagle and the American peregrine falcon (both of which are listed as endangered by the Department of the Interior), and the jaguarundi and ocelot (both of which are listed as threatened by the Bureau of Sport Fisheries and Wildlife). In addition, the Rio Grande darter, which is classified as a peripheral fish by the Bureau of Sport Fisheries and Wildlife, is also listed as threatened.

The wildlife description leaves the impression that song birds, small mammals, and reptiles do not exist in the area. The final statement could be improved by discussing, or at a minimum listing, all the known animal species of the project area.

In order to assess the potential impact of the project on wildlife, a discussion of ecological interrelationships is needed. What is the relationship of the wildlife to the vegetation in the area? How dependent are the various animal species on different vegetative species? What successional changes are taking place on the project area? Consideration of these data would strengthen the final statement.

The draft statement states, at the top of page 9, "There is no improper use of land in the watershed." However, in several places prior to this statement, the environmental impact statement uses such terms as "poor to fair condition" and, on page 3, overgrazing is discussed. These terms, to us, denote improper land use. We would suggest a reanalysis of the use of these terms and particularly the "improper use of land" statement.

Page 11, fifth full paragraph: The second to last sentence should be qualified to indicate for which species wildlife habitat would be greatly enhanced.

Planned Project

The draft statement fails to describe what we feel are several significant aspects of the project. The location and removal of the fill material and limestone rock for the flood structure was not discussed. The removal of these materials could have serious impact on wildlife, soil, water, and air quality.

Page 12, second paragraph, second sentence: It would be helpful if "needs" were qualified to show what is needed.

Page 12, fourth paragraph: To objectively review the environmental statement, it would be helpful to know acreages involved in brush control that will be compatible with wildlife needs, acreages of barren areas in the sediment pool and adjacent soils that will be seeded with herbaceous vegetation, the number of watering systems to be built with devices to provide ground level access for wildlife, and the number of ponds which will be constructed and stocked with fish.

Page 13, third full paragraph, first sentence: The location of the emergency spillways in relation to San Felipe Spring should be given. This information would help in determining the effect of the project on fish and wildlife.

Page 13, fourth full paragraph, first sentence: The location of the borrow site and a description of its vegetative cover should be mentioned. This would be helpful in assessing the impact of the project.

Environmental Impact

The final statement would be improved by a more objective and detailed analysis of the potential impacts which could result from project implementation. The impact statement states that an increase in density of grasses and forbs would improve habitat conditions for big game. Depending on what habitat factors are limiting big game populations, increased density may not improve big game habitat conditions.

The impact of removing material for construction of the dam should be analyzed, as it is an integral part of the project.

A discussion of the impact on water quality and on San Felipe Spring from construction of a dam above it should be included in the discussion of impacts.

As the draft states, the project will be eliminating brush species. The statement that "land treatment measures... benefit big and upland game by providing more forage and browse" appears to conflict with the fact that brush will be eliminated on the project area. This impact should be reanalyzed to determine if it is actually an impact.

The National Park Service has requested funds for archeological excavation in advance of construction in the San Felipe Watershed; however, appropriation of these funds is not a certainty. Thus, the Soil Conservation Service should be prepared to fund needed excavation to mitigate the adverse effects of the proposal on cultural resources.

Page 18, fifth paragraph, last sentence: Increasing the density of grasses will not improve habitat for big game and would have an adverse effect on small-game habitat. We suggest changing this sentence to reflect the above.

Page 20, first paragraph, last sentence: It would be helpful to know the concentration of suspended sediment leaving the watershed, including the flow from San Felipe Spring, when evaluating the project's effects on the downstream fishery.

Page 21, last paragraph: This paragraph should be expanded to include the project's effects on endangered and threatened wildlife species found in the watershed. It would be helpful to know if the unique fishery will be adequately protected during the construction phase of the project; will the use of herbicides (page 17, third paragraph, first sentence) for maintenance of the structure affect the wildlife populations downstream; will water

temporarily held in the structure increase in temperature so when it seeps into the aquifer the temperature of the discharge will be affected; will agricultural chemicals be introduced into the aquifer by seepage from the impounded waters; will the rate of discharge from San Felipe Spring be affected by the structure, will the reduced level and volume of floodwaters affect the downstream fishery, the acreage of idle or eroded land that will be planted with woody and seed-bearing vegetation, and the acreage of brush control that will not significantly limit the cover and movement of wildlife.

Page 25, number 14.,b: If brush control with wildlife considerations is to be listed as a favorable environmental effect, a definite statement is needed that brush control with wildlife considerations will be encouraged. Encouragement denotes hope rather than reality.

Page 25, number 14.,c. and d: As stated in our comments on the summary sheet, there appears to be some inconsistency regarding permanent water in ponds.

Favorable Environmental Effects and Adverse Environmental Effects Which Cannot Be Avoided

Some mention of the project's effects on endangered and threatened wildlife species should be made under the appropriate section.

Many of the beneficial impacts are based on the premise that proper land use will be practiced by the landowner, especially grazing management. Unless there is some measure to insure proper land use, including livestock grazing, there may be some validity in discussing impacts which would occur from the project if proper land management measures were not practiced. Some of these impacts would be associated with: creating additional livestock watering facilities which could result in additional overgrazing; and removal of all brush instead of selective brush removal, which would seriously impact wildlife populations.

Alternatives

Discussion of alternatives and associated impacts was not adequate in detail to allow the reader to compare the net residual impact of each alternative with other alternatives on the proposed action. A more in-depth discussion of alternatives would improve the final statement. We feel that several other alternatives merit discussion:

1) implement proper grazing measures without vegetative manipulation and construction of the dam; and 2) construct the dam to maintain a recreation pool and provide public access to the pool. As presently proposed, the entire project is essentially a single use project, being constructed with Federal monies. Consideration possibly should be given to analyzing a multi-purpose project alternative.

Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

This section should be expanded to include a discussion on a basin-wide basis, of the cumulative effect of this project on the endangered and threatened wildlife species. A discussion of this type is of particular importance because of the limited habitat that is available or will support these species.

The discussion under this section indicates to us that a programmatic or basin-wide environmental statement should be prepared for the Texas portion of the Rio Grande Basin. By preparing environmental statements on individual watersheds, the total impact is not analyzed. The impact of each small watershed project may be minor, but, taken as a whole, the many proposed projects could have a major impact. As stated, there are a total constructed or estimated 146 floodwater retarding structures; 117 miles of channelization (channel improvement); and 15 miles of floodwater diversion. This does not include the many thousands of acres of land treatment measures that will be proposed. We would recommend that an environmental statement be prepared on the basin to adequately examine the total environmental impacts.

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We trust the foregoing comments will assist you in processing this report to the Congress. Further, we request that the enclosed report of our Bureau of Sport Fisheries and Wildlife accompany your report when it is forwarded for Congressional consideration.

Sincerely yours,

Acting
Deputy Assistant

Willia Dayly
Secretary of the Interior

Mr. Kenneth E. Grant
Administrator
Soil Conservation Service
Department of Agriculture
Washington, D. C. 20250

Enclosure



CUPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGIONAL OFFICE 1114 COMMERCE STREET DALLAS, TEXAS 75202 January 31, 1974

OFFICE OF
THE REGIONAL DIRECTOR

Our Reference: EI # 0174 302

Mr. Kenneth Grant Administrator U. S. Department of Agriculture Soil Conservation Service Washington, D.C. 20250

Dear Mr. Grant:

Re: Watershed Work Plan-San Felipe Cree Watershed, Val Verde, Texas

1974 FEB ~5 PH 12

Pursuant to your request, this office has completed a Departmental review of the Environmental Impact Statement in accordance with the provisions of Section 102(2)(C) of P. L. 91-190 and the Council on Environmental Quality Guidelines of April 23, 1973.

Environmental health program responsibilities and standards of the Department of Health, Education, and Welfare include those vested with the United States Public Health Service and the Facilities Engineering and Construction Agency. The U. S. Public Health Service has those programs of the Federal Food and Drug Administration (milk, food, interstate travel and shellfish sanitation) and of the Health Services and Mental Health Administration, which include the Eureau of Community Environmental Management (housing hygiene, injury control, recreational health, and insect and rodent control) and the National Institute of Occupational Safety and Health.

Attached are comments and reactions to the Environmental Statement made by departmental agencies concerned with environmental health aspects of the project.

We thank you for the opportunity to coordinate our mutual environmental interests as they relate to this project proposal.

Very truly yours,

William F. Crawford

Environmental Impact Coordinator

H BRISCOE

OFFICE OF THE GOVERNOR DIVISION OF PLANNING COORDINATION

JAMES

minustrator

March 5, 1974

Mr. Kenneth E. Grant Administrator United States Department of Agriculture Soil Conservation Service Washington, D. C. 20250

Dear Mr. Grant:

The "Draft Environmental Impact Statement and Work Plan for San Felipe Creek Watershed, Val Verde County, Texas," as submitted by the United States Department of Agriculture, Soil Conservation Service, has been reviewed by the Governor's Division of Planning Coordination and other State agencies.

Review participants generally found the Draft Environmental Impact Statement to be in conformity with the provisions of the National Environmental Policy Act of 1969. However, certain specific comments were made by the following agencies.

- 1. The Texas Water Rights Commission recommended consideration of adopting concurrent non-structural or administrative features in the project area. Additional comments relative to impoundment of water and its eventual utilization were made by the Commission.
- 2. The Texas Highway Department noted that clarification is needed concerning the location of the borrow pit, so that this proposed project will not conflict with anticipated highway construction.
- 3. Specific comments from the Bureau of Economic Geology should be thoroughly reviewed, especially regarding the possibility of adverse affects on the water supply for both the city of Del Rio and for Laughlin Air Force Base.

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

Reaction Review and Comments on Environmental Impact Statement for Project Proposal:

Draft Environmental Impact Statement Reviewed With Objections

Draft Environmental Impact Statement Reviewed With No Objections

Date: 24 January 1974

EI# 0174-302

Agency/Bureau: DHEW/U.S. Public Health Service

Project Proposal: Watershed Work Plan-San Felipe Creek Watershed, Val Verde, Texa

Comments: Vector Control measures should be considered where the floodwater retarding structure is concerned. The attached publication contains general recommendations that should be incorporated into the plan in conjunction with appropriate State and County regulations relative to the control of vectors.

Mr. Kenneth E. Grant Page 2

Attached for your consideration are the comments made by all reviewing agencies. These comments should be considered in their entirety.

If we can be of further assistance, please let us know.

Sincerely,

MES M. ROSE

irector

JMR/wsb Enclosures

cc: Mr. A. E. Richardson, Texas Water Rights Commission

Mr. Harvey Davis, Texas State Soil and Water Conservation Board

Mr. B. L. DeBerry, Texas Highway Department

Mr. Harry P. Burleigh, Texas Water Development Board

Dr. W. L. Fisher, Bureau of Economic Geology

Mr. Hugh C. Yantis, Jr., Texas Water Quality Board

Mr. James H. Harwell, Texas Industrial Commission

Mr. Truett Latimer, Texas Historical Commission-

Mr. Clayton Garrison, Texas Parks and Wildlife Department

Hon. John C. White, Texas Department of Agriculture

TEXAS WATER RIGHTS COMMISSION

SAM HOUSTON STATE OFFICE BUILDING

COMMISSIONERS

DE D. CARTER, CHAIRMAN 475-2453

THA F. DENT 475-2451

ORSEY B. HARDEMAN

February 4, 1974

A. E. RICHARDSON
EXECUTIVE DIRECTOR
475-2452
AUDREY STRANDTMA
SECRETARY
475-4514

Mr. James M. Rose, Director
Governor's Division of Planning
 Coordination
P. O. Box 12428, Capitol Station
Austin, Texas 78711

Re: U.S. Department of Agriculture, Soil Conservation Service Documents:

- A. Watershed Work Plan (WWP),
 (January 1973),
- B. Draft Environmental Statement
 (DES), (October 1973),

Relative to San Felipe Creek Watershed, Val Verde County, Texas.

Dear Mr. Rose:

The staff finds that:

1. The reference iments appear to be in satisfactory compliance with the relevant provisions of:

Mr. James M. Rose February 4, 1974 Page 2

- a. The Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566, 68 Stat. 666, as amended, 16 U.S.C.A., 1001, et seq.); and,
- b. Section 102(2)(C) of the National Environmental Policy Act of 1969.
- The project would be enhanced if, in addition to the 2. proposed structural and non-structural (land treatment) features of the project, consideration were given to the concurrent adoption, to the maximum reasonable degree possible, of a combination of the other nonstructural measures, i.e., restrictions on construction in flood hazard areas, flood insurance, purchase of certain critical urban flood plain areas with relocation of existing facilities, change in land use, and flood proofing of existing facilities (WWP, p. 2 of Summary). This suggestion is made in light of the fact that the bulk of the benefits of this project consists in the reduction of flood damages to residential property; WWP, p. 36, indicates that of the total estimated average annual flood damage reduction benefits of \$181,600, the benefits accruing from the protection of residential property is \$123,950, based on the 100-year-frequency flood. Apparently, the benefits resulting from flood damage reduction to residential areas have the greatest impact on the very favorable project benefit-cost ratio of 5.9 to 1.0 (considering the structural measures only), and the benefit-cost ratio of 6.3 to 1.0 (considering the total project, including secondary benefits). (See WWP, Addendum No. 1.) In short, all reasonable non-structural or administrative measures should be adopted to supplement the more basic and non-structural elements of the watershed project in order to preclude unjustified total dependence on limited measures for urban flood protection.

Mr. James M. Rose February 4, 1974 Page 3

- The DES would be enhanced if further justification 3. were given to the evaluation made on page 30, DES, that the referenced San Felipe Creek Watershed project be considered on the basis of the entire Rio Grande Basin and "will not result in a significant cumulative effect upon the environment because of the small total area of all potential watershed projects in relation to the total area of the basin, and the great diversity of project locations." In other words, it is not apparent that only minimal impacts will result from developments in 25 watersheds, comprising 3,034 square miles, or about 6.28 percent of the Rio Grande Basin area in Texas (WWP, p. 29). It is not evident that the 97 floodwater retarding structures, 103 miles of channel work, and 13 miles of floodwater diversions constructed or planned, affecting 1,965 square miles, or 4.1 percent of the total Rio Grande Basin in Texas would have no significant environmental, social, economic, and hydrologic impacts (WWP; p. 30). Based on the highly favorable benefit-cost ratio developed for the San Felipe Creek Watershed, it would appear that comparably favorable benefit-cost ratios and enhanced environmental conditions would result from the basinwide program.
- 4. Statements made in the Work Plan and the Environmental Statement, regarding the impoundment of water other than for floodwater retardation purposes, and the water rights impacts thereof, should be made unmistakably consistent. Specifically, WWP, p. 18, indicates that:

"It is not expected that the pool of the floodwater retarding structure will hold for significant periods of time because of anticipated high rates of seepage. If at any future time the structure should hold water, the quality should be excellent for

Mr. James M. Rose February 4, 1974 Page 4

any domestic or recreational use. However, prior to any use of the water that might be impounded at some future time, the Val Verde County Commissioners Court will obtain approval from the Texas Department of Health and appropriate local health agencies." (Emphasis added.)

On the other hand, the DES, page 13, indicates that:

"The principal spillway will be ported at the 189 acre-foot elevation. The structure will have provisions to release impounded floodwater in order to perform maintenance, and if it becomes necessary, to avoid encroachment upon downstream water rights. It is not expected that the pool of the floodwater retarding structure will hold water for significant periods of time because of anticipated high rates of seepage." (Emphasis added.)

Analysis of the foregoing citations indicates that there is a great probability that water will be impounded for other than floodwater retarding purposes, however, there is not sufficient emphasis on the requirement for obtaining from the Texas Water Rights Commission the appropriate water rights permits for such use of the reservoir.

The foregoing above comments are given with constructive intent with the view toward assisting the planners concerned in their efforts to develop a sound project and justification therefor.

If you have any questions on the foregoing comments, please contact Dr. Alfred J. D'Arezzo, Environmental Sciences Analyst, telephone number 512-475-2678, who has been designated as the Commission's staff review coordinator on this case.

Sincerely yours,

A. E. Richardson



TEXAS STATE SOIL AND WATER CONSERVATION BOARD

1018 First National Building Temple, Texas 76501 AREA CODE 817, 773-2250 February 4, 1974

Brigadier General James M. Rose Director, Executive Department Division of Planning Coordination Box 12428, Cavitol Station Austin, Texas 78711

Re: San Felipe Creek Watershed Project
Work Plan and Environmental Statement

Dear General Rose:

We believe that the San Felipe Creek Watershed Project in Val Verde County has been thoroughly reviewed and that the referenced doçuments need no further comment.

Thank you for the opportunity to submit our views.

Sincerely yours,

Harvey Davis

Executive Director

HD:ej



REAGAN MOUSTON, CHAIRMAN DEWITT C. GREER CHARLES E. SIMONS

TEXAS HIGHWAY DEPARTMENT

B. L. DEBERRY

January 30, 1974

IN REPLY REFER TO FILE NO. D8-P 454

United States Department of Agriculture Draft Environmental Statement and Work Plan Val Verde County

San Felipe Creek Watershed

Mr. James M. Rose, Director Division of Planning Coordination Office of the Governor P.O. Box 12428, Capitol Station Austin, Texas 78711

Dear Mr. Rose:

Reference is made to your letter dated January 8, 1974, in regard to a draft environmental statement and work plan on the San Felipe Creek Watershed.

The subject documents have been reviewed and it is noted that elevations shown on Figure 2A of the "Work Plan" do not correspond with the sea level elevations shown on Page 2, Environmental Setting, of the Draft Environmental Statement, hence the principal and emergency spillway crests are not clear.

Figure 2A of the "Work Plan" indicates that a borrow source is to be located downstream from the dam. Since the Plan of Highway Development for Del Rio published in 1965 proposes the development of a highway connection between U.S. 90-East and U.S. 90-North extending across San Felipe Creek through the area south of the proposed dam near borrow source Area A, it is very possible that the location of the borrow area will conflict with the proposed highway location. Therefore, it is recommended that before project implementation, the matter of the elevations be clarified and that the location of the proposed borrow be correlated with departmental District Engineer Fred W. Clark Jr. In Del Rio.

Thank you for the opportunity to review these documents.

Sincerely yours

B. L. DeBerry State Highway Engineer

By

R. L. Lewis, Chief Engineer

of Highway Design

cc: Federal Highway Administration

LEXAS. WATER DEVELOPMENT BOARD

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AL ILLIG



P.O. BOX 13087 CAPITOL STATION AUSTIN, TEXAS 78711

January 28, 1974

HARRY P. BURLE

AREA CODE 51 475-2201

301 WEST 2ND ST

TWDBP-O

General James M. Rose, Director Division of Planning Coordination Office of the Governor P.O. Box 12428, Capitol Station Austin, Texas 78711

Dear General Rose:

Please refer to your memorandum dated January 8, 1974 transmitting for review and comments the Soil Conservation Service's "Draft Environmental Statement and Work Plan for San Felipe Creek Watershed, Val Verde County, Texas."

The proposed plan of improvement does not contemplate the development of water for conservation (water supply) purposes, and will not conflict with the Texas Water Plan. Need for flood control measures along that portion of San Felipe Creek passing through the City of Del Rio is recognized. It is assumed that the control measures proposed would be sound, and environmentally acceptable.

It is noted on page 15 of the Environmental Impact Statement, paragraph 1, that the sponsoring agencies plan to work with the Texas Water Quality Board in an effort to prevent possible contamination of groundwater resources in the area. We concur in this proposed action.

Our staff-level review of these reports finds them to be sufficiently comprehensive, and that the intent of Public Law 91-190, Section 102(c) has been fulfilled.

We appreciate the opportunity to offer these comments.

Sincerely,

for Harry P. Eurleigh



THE UNIVERSITY OF TEXAS AT AUSTINBUREAU OF ECONOMIC GEOLOGY AUSTIN, TEXAS 78712 January 24, 1974

ity Station, Box X 12-471-1534

> General James M. Rose, Director Division of Planning Coordination Post Office Box 12428, Capitol Station Austin, Texas 78711

Dear General Rose:

The staff of the Bureau of Economic Geology has reviewed the draft environmental statement and work plan for the San Felipe Creek Watershed, Val Verde County. We offer the following comments:

Approximately 20 percent of the reservoir watershed will drain Del Rio Clay, whereas the reservoir itself will lie on Georgetown Limestone. The Del Rio Clay terrane is highly erosive, and sediment derived from the watershed will be trapped in the reservoir. This poses dual problems—one short—term and one long—term.

The immediate effect of impoundment of water with a high suspended sediment load will be recharge of turbid water into the Georgetown-Edwards limestone aquifer system by means of fractures and solution conduits in bedrock. Induced recharge by water of high turbidity could adversely affect the water quality of San Felipe Springs, which is the water supply for the city of Del Rio and Laughlin Air Force Base.

Eventually, fine-grained sediment may plug the leaks in the reservoir allowing an increased rate of reservoir siltation. Increased sedimentation will shorten the useful life of the reservoir as a flood-control structure. This effect is a long-term problem, however.

No alternatives to the project are suggested, but it is interesting to note that a 783-acre reservoir will protect a floodplain of less than 700 acres. A comparison between the costs of the proposed project and costs of relocation and restriction of floodplain development would be illuminating.

Thank you for the opportunity to review this statement.

Sincerely

W. L. Fisher

Director

CHAIRMAN ANK LEWIS VICE-CHAIRMAN

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TEXAS WATER QUALITY BOARD

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PH. 475-2651 A.C. 512



314 WEST 11TH STREET 78701 P.O. BOX 13246 CAPITOL STATION 78711 AUSTIN, TEXAS

January 15, 1974

Draft Environmental Statement San Felipe Creek Watershed, Val Verde County

Mr. James M. Rose, Director Division of Planning Coordination Office of the Governor Box 12428, Capitol Station Austin, Texas 78711

Dear Mr. Rose.

The staff of the Texas Water Quality Board has completed a review of the Draft Environmental Statement for the San Felipe Watershed project in Val Verde County, and have concluded that this project would not pose lasting adverse environmental problems. We have noted that provisions have been made in the plan to protect the area from soil erosion and from water and air pollution both during and after construction. Also that assurances have been given that adequate sanitary facilities meeting state health standards will be provided at the reservoir prior to recreational use should it hold a reliable impoundment of water.

We appreciate the opportunity to review this environmental statement. If we can be of further assistance, please let us know.

Very truly yours,

Emory G. Long, Director

Administrative Operations Division

GEJ:dh

January 23, 1974

Mr. James M. Rose Director Division of Planning Coordination Office of the Governor P. O. Box 12428, Capitol Station Austin, Texas 78711

Dear Mr. Rose:

I have carefully reviewed to a Draft Environmental Statement and Work Plan for San Felipe Creek Walershed, Val Verda County, Texas for the Texas Industrial Commission. It appears that the benefits to be derived from this project outweich the adverse effects resulting from its completion. As a result of this review, the Industrial Commission has no adverse comments to make on this project.

Sincerely,

Director of Research &

Planning

FJC:co



Texas State Historical Survey Committee
Box 12276, Capitol Station, Austin, Texas 78711
Truett Latimer
Executive Director

January 10, 1974

Mr. James M. Rose, Director Office of the Governor Division of Planning Coordination P. O. Box 12428, Capitol Station Austin, Texas 78711

RE: Draft Environmental Statement and Work Plan for San Felipe Creek Watershed, Val Verde, Texas.

Dear Mr. Rose:

In response to your request concerning the above-referenced project, we have examined the document and find that those sections pertaining to cultural (prehistoric, historic, architectual) resources have been carefully and adquately prepared. If the procedures recommended for mitigation of the loss of these resources (scientific recovery by excavation and subsequent analysis) are followed, the agencies involved will have fulfilled their responsibilities concerning cultural resources.

Thank you for the opportunity to review and comment on this D.E.S. and Work Plan. If we can be of further assistance, please advise.

Sincerely,

Truett Latimer Executive Director

Bout Fills

By

Alton K. Briggs Archeologist

AKB:pc

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STO



CLAYTON T. GARRISON EXECUTIVE DIRECTOR

JOHN H. REAGAN BUILDING AUSTIN, TEXAS 78701

February 5, 1974

COMMISSIONERS

BOB BURLESON TEMPLE

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LOUIS H. STUMBERG

Mr. James M. Rose, Director Division of Planning Coordination Executive Department Box 12428, Capitol Station Austin, Texas 78711

ATTN: Mr. Bill Duncan

Dear Mr. Rose:

The Texas Parks and Wildlife Department has reviewed the Draft Environmental Statement and Work Plan for San Felipe Creek Watershed, Val Verde County, Texas.

The narrow time frame within which we were required to investigate and comment upon this project permitted only a cursory review. Based upon the review, this Department offers no comment.

Thank you for the opportunity to coordinate with your Division.

Sincereiy,

CLAYTON T. GARRISO Executive Director

CTG: WJS/mc



EDMUND L. NICHOLS Assistant Commissioner

February 11, 1974

General James M. Rose Director Office of the Governor Division of Planning Coordination Austin, Texas 78711

Dear General Rose:

We have reviewed the Draft Environmental Statement and Work Plan for San Felipe Creek Watershed, Val Verde County, Texas, enclosed with your memorandum of January 8, 1974. This project is comparable to another recently reviewed where housing and business construction was allowed to proceed in a flood prone area. It is possible however, that flood data on San Felipe Creek may not have been available or accurate in the early stages of urban development along its banks.

It appears that the construction planned for this flood plane will satisfy the stated objectives of the project, the cost to be borne by public funds.

Thank you for the opportunity to review this statement.

Edmund L. Nichols

ELN/yv

MIDDLE RIO GRANDE DEVELOPMENT COUNCIL

P. O. BOX 1461

DEL RIO, TEXAS 78940 WS(PL 500) 0-5

February 19, 1974

Mr. Edward E. Thomas State Conservationist Un. S. Dept. of Agriculture Soil Conservation Service P.O.Box 648 Temple, Texas 76501

> RE: Environmental Statement San Felipe Creek Watersheld

Dear Mr. Thomas:

On January 31, 1974, the Middle Rio Grande Development Council Project Review Committee reviewed a copy of the draft environmental statement for the San Felipe Creek Watershed.

The MRGDC Project Review Committee has reviewed this statement and has found it to be consistent with the goals and objectives of comprehensive planning and the development of the Region.

The MRGDC, acting in its aspacity as designated Regional Clearinghouse, will have no further comment on this project.

Sincerely,

Afredo Gutierrez, Jrj.

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